THE LEGAL GREEN RUSH: NEW CALIFORNIA AGRICULTURAL GEOGRAPHIES IN COMMERCIAL CANNABIS CULTIVATION

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ABSTRACT

THE LEGAL GREEN RUSH: NEW CALIFORNIA AGRICULTURAL GEOGRAPHIES IN COMMERCIAL CANNABIS CULTIVATION

By

Lucas Y. Reyes

August 2018

Marijuana has been given many names that connote an underground existence, but has rarely been identified as an agricultural crop. California joins a growing number of states to decriminalize adult (recreational) use of cannabis over twenty years after passing California Proposition 215 which decriminalized medical use of marijuana. Illegality kept economic impacts of cannabis agriculture in the shadows; 2008 conservative estimates for California total $20 billion in wholesale value. If, as suggested by California Assemblyman Jim Wood, cannabis is “going to be treated as an agricultural product,” a critical examination of cannabis as agriculture is needed. This research investigates who cannabis cultivators were before legality and where they were located; likewise it explores who are the potential new cannabis cultivators entering the industry. Data indicate the largest concentration of interest in cannabis cultivation is in southern California and that a patchwork of legislation may severely inhibit large-scale cannabis cultivation in regions like the Central Valley.

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LIST OF ABBREVIATIONS AND NOMENCLATURE

Adult Use	Recreational Use
AUMA	CA Proposition 64 (Adult Use of Marijuana Act), Control, Regulate and Tax Adult Use of Marijuana Act
Cannabis	Contested plant whose species include *Cannabis sativa*, *Cannabis indica* and *Cannabis ruderalia*; marijuana and Hemp
CBD	Cannabidiol, psychoactive ingredient in cannabis with believed medicinal properties
CGA	California Growers Association
CUA	CA Proposition 215, Compassionate Use Act
CSULB	California State University, Long Beach
Central Valley	Central San Joaquin Valley
CDFA	California Department of Food and Agriculture
Cultivation/production	Cannabis farming
Cultivators, farmers, growers	Cannabis farmers
Ganjapreneur	Cannabis entrepreneur
Grow	Cannabis operation
Hemp	Fibrous cannabis varieties, less than .3% THC
IRB	Institutional Review Board of CSULB
MMC	Medical Marijuana Card
MMP	Medical marijuana program
Marijuana	Psychoactive cannabis varieties, high in THC
MAUCRSA	Medicinal and Adult-Use Cannabis Regulation and Safety Act

MCRSA	Medical Cannabis Regulation and Safety Act
MMRSA	Medical Marijuana Regulation and Safety Act
THC	delta-9 tetrahydrocannabinol, psychoactive ingredient that makes people "high"
The Hill/Mountain	Local Emerald Triangle name for remote and secluded grows
Trimigrants	Seasonal cannabis agriculture workers that manicure mature cannabis flower and work on grow sites

CHAPTER 1

INTRODUCTION

Henry Miller and Charles Lux established Bowles Farming Company in 1858 on the west side of Merced County, California (see Figure 1). One hundred and fifty years later the farming operation is overseen by Cannon Michael, its CEO and a sixth generation family member. Bowles Farming Company cultivates over twenty diversified row crops on an expanse that now occupies 12,000 acres of prime agricultural land. Mr. Michael sees a future in legal marijuana production and has laid the groundwork to enter the so-called “Green Rush,” the torrent of venture capitalists who look towards California marijuana as an extremely profitable industry to enter after the adoption of non-prohibitionist legislation (Romero 2016). Nearly a decade ago Mr. Michael discovered a one-acre illegal marijuana grow, valued at nineteen million dollars, hidden along a water bypass that runs through the middle of his property, leading to natural sloughs that scatter areas near the dry San Joaquin River among his cultivated acreage (Romero 2016; Danny, interview with author 2018). The CEO of Bowles Farming Company posed the question of whether the marijuana market could handle large-scale production of 200 acres. "To me it’s just another potential option for something that could be a benefit to the farm, and then also make some money hopefully," Michael says (Romero 2016) and the Bowles Farming Company is laying the groundwork to grow cannabis as soon as Federal, State and local regulations permit.

Reefer, ganja, weed. Cannabis has been given many names that connote an underground existence, but in mainstream understandings the plant has rarely been identified as an agricultural product. However, residents of northern California have grown cannabis for over half a century. Farmers in the geographically isolated “Emerald Triangle” – Humboldt, Mendocino, and Trinity counties (see Figure 1) – cultivate in the shadows of redwood forest and legality (Leeper 1990). In 1996 California decriminalized marijuana use for patients as an alternative medical therapy by passing Proposition 215, the Compassionate Use Act (CUA) (Stoa 2017). Fast forward twenty years; under Proposition 64 California joins an increasing number of states that are developing and implementing non-prohibitionist regulation models that decriminalize the plant's use recreationally (Steinmetz 2016). The approval of Proposition 64, the Adult Use of Marijuana Act (AUMA), in California comes after Colorado, Washington, Oregon, and Alaska legalized recreational use; results from the November 2016 election showed that Massachusetts, Nevada and Maine would also legalize (Steinmetz 2016). Many states that have legalized cannabis follow a model created for regulating alcohol, such as Colorado's constitutional Amendment 64, Regulate Marijuana Like Alcohol Act of 2012 (Hickenlooper 2014). California's Proposition 64 takes a different path: it reintroduced cannabis as an agricultural commodity.

Cannabis agriculture and its contribution to both state and national economies are not well known. Starrs and Goin (2010) conservatively calculate 2008 California cannabis cultivation at nearly $20 billion in wholesale value. It was recently assessed that there are 68,150 cannabis farmers in California today (Sandy 2018). Many scholars contend that cannabis is California's largest crop (Starrs and Goin 2010) and should be viewed as an agricultural product. Yet governmental agencies, as well the American public, hold a poor understanding of cannabis as an agricultural crop, leading to difficulties in the conceptualization and actualization of this new perspective (Butsic and Brenner 2016). Few realize that founding fathers George Washington and Thomas Jefferson both farmed cannabis's fibrous hemp variety and drafts of the US Constitution were signed on hemp paper (Herer, Cabarga, and McCormick 2000; Stoa 2017).

The history of cannabis in California tells its origin story via the Spanish, brought as a fiber crop (hemp) and known today by its Mexican name, marijuana (Gieringer 1999).

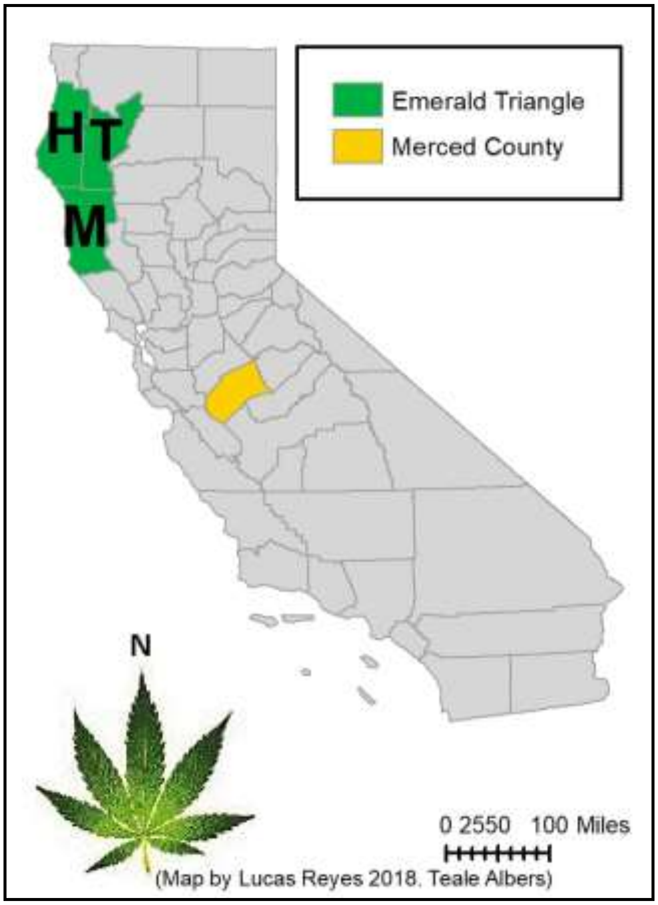


FIGURE 1. California's Emerald Triangle (composed of (H)umboldt, (T)rinity and (M)endocino counties) and Merced County.

This research aims to examine how legalization will shape changes in scale and geographic distribution of commercial cannabis cultivation across California. Implementation of Proposition 64 on January 1, 2018 portends a sea change in the cannabis agricultural industry by bringing cannabis cultivation out of the shadows of illegality. Decriminalization of cannabis opens the door for “Big Agribusiness” to capitalize and begin large-scale production. This poses challenges for northern California farmers who have cultivated cannabis for decades and will not only face competition from new, larger players, but will also confront a post-prohibition regime of regulation. These changes will result from decisions of farmers responding to new contexts of legality and government policies that regulate new industries. Therefore, another purpose of this research is to investigate the motivations of farmers who desire to enter or continue within the industry.

In pursuit of these fundamental goals, this research develops a comparison between established cannabis farmers and those trying to break into the legal cannabis industry, and identifies the role cannabis serves in California agriculture. California Assemblyman Jim Wood, author of 2016's Medical Cannabis Regulation and Safety Act (MCRSA) which established licensing classifications for the medical and commercial marijuana industries, said that "cultivators are going to have to comply with the same kinds of regulations that typical farmers do…. it's [marijuana] going to be treated as an agriculture product" (Stoa 2017, 5). This analysis can contribute to unveiling the agricultural geography embedded in marijuana cultivation in the Emerald Triangle and the Central Valley. These two California regions have unique environmental and economic histories and treating both as if they are the same will not add to any understanding of marijuana as agriculture or equate to the same success of the industry when working at scales vastly different. Farmers in the Emerald Triangle pride themselves on sun-grown (outdoor) marijuana. As land in the Central Valley becomes less productive from overuse of the land and chemical use, and water to sustain high water crops like almonds becomes more scarce, new farmers are looking to the green revolution technology of greenhouses as a viable agricultural medium and hemp cannabis cultivation to improve soil health (Kolosov 2009) and diversify farm offerings.

This research aims to answer the following two sets of questions:

1. Who are the marijuana growers emerging from the shadows of prohibition, why did they persist in the face of illegality, and what impacts to the industry do they foresee in the new context of legality?
2. Who are the new entrepreneurs entering the industry, where are they located, what are their intended scales of production, and what are their motives?

Answering these inquiries permits an examination of how legalization will shape changes in the scale and geographic distribution of commercial cannabis cultivation across California, to investigate the motivations of farmers who desire to enter or continue within the industry and describe current and future cannabis farmers in the Emerald Triangle and Central Valley.

Increased policy liberalization across the country carries with it a need for greater research on the cannabis system as a product of agriculture (Butsic and Brenner 2016). The illegality of cannabis has suppressed the ability to develop a clear picture of mixed, uneven marijuana cultivation practices (Stoa 2017). A century ago, German geographer H. Bernhard stated, "Agricultural geography strives to bring light to the spatial variation in agriculture and the reasons for them" (1915, 12f, as quoted in Gregor 1970, 2). On the global scale, the most widely consumed illicit drug is cannabis (Taylor, Jasparro, and Mattson 2013). Cannabis is estimated to be California's most profitable commodity (Starrs and Goin 2010). Yet, despite the economic importance of the plant to the state economy, no research exists that examines marijuana cultivation and production at a regional scale (Taylor, Jasparro, and Mattson 2013) in the Golden State, until recently (Keene 2015). Its classification federally as a Schedule I illicit substance limits research on cultivation practices and environmental impacts of cannabis cultivation, except in states that have liberalized regulations on cultivation, possession or use that utilizes no federal funding. Cannabis agriculture is therefore understudied and underestimated, and policy liberalization offers an opportunity to respond to the need for more research (Butsic and Brener 2016). This situation presents an excellent opportunity to contribute to the discipline of agricultural geography by confronting the question posed by H. Bernhard: How is marijuana "related to the present spatial conditions of agriculture and in what way natural, economic, and cultural factors share in the associated differentiations?" (1915, 100-103, as quoted in Gregor 1970, 5).

The issue of scale in cannabis cultivation is an area of growing debate and future potential conflict. Common practice among cannabis farmers is to measure their crops on a plant scale, not an acre scale. Statements like Mr. Michael's interest to grow 200 acres of marijuana, discussed above, have many in northern California's Emerald Triangle panicked as they imagine imperiled futures should large-scale production enter the market as a major player (Romero 2016). Hezekiah Allen of the California Growers Association, an organization of small scale cannabis cultivators, does not see the value in growing at such a large scale and hopes that the industry will not move towards consolidation or larger scale growing operations. Allen believes that there is a role for agribusiness in cannabis production, specifically the cultivation of industrial hemp (Romero 2016), which contains very low levels of delta-9 tetrahydrocannabinol (THC), cannabis's psychoactive compound that makes one high.

Bernhard argues that the creation of agricultural data should start with an overview of the agricultural history of an area because, "it teaches us to understand the evolution of agriculture with its particular phenomena" (1915, 100-103, as quoted in Gregor 1970, 5), and thus this paper begins with a look at the history of cannabis agriculture through an exploration of literature on the cultivation of cannabis. To then explore how marijuana, "is related to the present spatial conditions of agriculture and in what way natural, economic, and cultural factors share in the associated differentiations," methods used to identify cannabis cultivation concentrations and recognize the patchwork of laws regulating cultivation, as well as distinguish past, present and potential cannabis farmers are expanded upon before moving into results and conclusions that "look to the future," to provide the "missing link for the creation of a methodological whole" (Bernhard 1915, 100-103, as quoted in Gregor 1970, 5), for scholars to move forward studying cannabis as agriculture.

CHAPTER 2

BACKGROUND

History and Research Setting

“Weed” has long been the accepted term to describe cannabis, budding from the adaptability of cannabis and its ability to proliferate in every environment. Legalization of marijuana in California allows for the start of the production of industrial hemp as an agricultural product, as well as for agricultural or academic research (Office of the California Attorney General [OAG] 2015). The purpose and intent of the Adult Use of Marijuana Act (AUMA) is to develop a system to tax the commercial production and retail sale of marijuana; and to legalize, control, and regulate the cultivation, processing, manufacture, distribution, testing, and sale of non-medical marijuana. Some farmers in the Central Valley view marijuana production as the next big agricultural crop in a region known worldwide for its cultivation of fruits, vegetables, and nuts (Romero 2016).

Hemp is thought to have been harvested by the Chinese at least 6000 years ago, and possibly as far back as 8500 years ago (Small 2015) or even 10,000 years ago (Obasi 2011). Regardless the year of origin of cannabis cultivation, most agree that cannabis originates in Asia (Herer, Carbarga, and McCormick 2000; Obasi 2011; Small 2015). Historically, cannabis has been cultivated for three reasons: fiber, seed, and resin (Leeper 1990). Largely, it was valued as a source of stem fiber; the oldest evidence of hemp textiles date back six millennia (Herer, Carbarga, and McCormick 2000; Small 2015). Many cultures used marijuana as a medicine and for cultural purposes (Obasi 2011). In Africa the weed was recommended for pain relief and as an appetite stimulant, in China as a remedy for gout and inflammation, and in the nineteenth century doctors in the United States prescribed cannabis for a myriad of symptoms, from mania to depression to sexual disfunction (Obasi 2011).

Cannabis agriculture in California today is influenced by histories and technologies that have shaped the diverse geography of the state. Cannabis first came to California via the Spanish as hemp for cordage (Gieringer 1999), and early American colonists were required by the English crown to grow hemp for the same reason (Warf 2014; Stoa 2017). Agriculture production has increased greatly over the last century with support of green revolution technologies (Liebman 1983; Scheuring 1983). Spanish influence on California agriculture developed with large agricultural landholdings rooted in land grant tradition and centered on a mission culture (Scheuring 1983). Missions often occupied the most desired land, and the production of food on the land by padres revealed the quality of the soil (Scheuring 1983). In the earliest quarter of the last century, the policies of President Hoover encouraged immense growth of agricultural production on the California countryside (Stoll 1998). Approximately 50 percent of cropland and total irrigated acreage in California exists in the San Joaquin Valley (Scheuring 1983), one of the settings for this research that would be as dry as sand if not for massive government water-works like the Central Valley Project that diverts water from and dams five major river systems (Carle 2004).

Merced County ranks fifth in agricultural productivity statewide (Starrs and Goin 2010). The acres cultivated by the Bowles Farming Company in Merced County are geographically positioned in the Central Valley. The landscape is distinguished by its complex homogenization of small, precise land features shaping agricultural morphologies and impacted by water availability for irrigation (Starrs and Goin 2010). Total sales for the top fifteen commodities produced in Merced County top more than $3.2 billion (Robinson 2015). Milk is the top commodity followed by almonds, chickens, cows and calves, and sweet potatoes (Robinson 2015). Ninety-six percent of the sweet potatoes produced in California during 2008 were grown in Merced County (Starrs and Goin 2010, 314). Thirty-five Merced County agricultural products are exported to over 80 countries (Robinson 2015).

Nearly three hundred miles northwest of Merced County lies the Emerald Triangle. Marijuana is the most profitable agricultural product of the Emerald Triangle, most notably, Humboldt County (Leeper 1990; Starrs and Goin 2010), thought to be the birthplace of contemporary cannabis cultivation (Butsic and Brener 2016). The rugged terrain historically kept the coastal county isolated, shadowed with dense redwoods stands and populated by many tribal groups of California Natives until 1850 when Humboldt Bay was settled by whites and industry organized around primary resource extraction (Rohde 2014; Meisel 2017). The decline of primary industries like fishing and timber in Humboldt County created a wide opportunity for those trying to make a living in the faltering economy (Leeper 1990; Meisel 2017). Enter the "legacy" cannabis farmer, early sowers of cannabis seeds that established the industry decades before the passage of Prop 215 (Sandy 2018). The national War on Drugs begun by President Nixon in 1971 caused the price of marijuana to increase and inadvertently started the first "Green Rush," a migration to Northern California of ganjapreneurs (marijuana entrepreneurs) "for the sole purpose of making money in the cannabis industry" (Silvaggio 2018, 17), and to escape the pressures of booming cities (Meisel 2017; Sally, interview with author 2018). The passage of Prop 215 and SB 420 (see Table 1) shot the starting pistol for a second green rush that saw ganjapreneurs from all over the country move to the Emerald Triangle, shielded by protections in the legislation that allowed production of medical cannabis with a valid doctor's recommendation. California cultivated more outdoor cannabis than all of Mexico by 2009 (Silvaggio 2018).

Regulatory Realm

The regulation and legality of marijuana pose numerous questions for future policies (Gieringer 1999; Caulkins et al. 2011). California was a pioneer in the regulation of marijuana, banning cannabis in 1913, twenty-four years before the federal prohibition of "reefer" (as referred to in the law) (Gieringer 1999). In 1937 the federal government enacted the Marijuana Tax Act that created obstacles for the consumption, production, and sale of the plant (Stoa 2017). The law was later overturned when the courts found that compliance with the law encroached upon a person's right against self-incrimination in *Leary v. United States* (Stoa 2017). Congress repealed the Act after the decision and replaced it with the Comprehensive Drug Abuse Prevention and Control Act of 1970, classifying marijuana as a Schedule I narcotic that blocked production, possession, use and sale (Stoa 2017). Although California rejected a 2010 ballot initiative, Proposition 19, Regulate, Control and Tax Cannabis Act, analysis of legislative documentation indicated wholesale prices would decline dramatically and legalization would increase consumption at an unclear rate (Caulkins et al. 2011).

The California Land Conservation Act of 1965, known as the Williamson Act, defines an "agricultural commodity" as, "any and all plant and animal products produced in this state for commercial purposes, including, but not limited to, plant products used for producing biofuels" (California State Assembly [CSA] 2017, Assembly Bill [AB] 1562, Section 51201). The Williamson Act further defines "agricultural use" as "use of land, including but not limited to greenhouses, for the purpose of producing an agricultural commodity for commercial purposes" (CSA 2017, AB 1564, Section 51201).

TABLE 1. Contemporary Cannabis Regulations in California

Year	Legislation	Purpose
1996	Prop 215, CUA	Decriminalized use of marijuana as alternative medical therapy
2001	SB 676, California Industrial hemp farming act	Redefine marijuana to exclude hemp, allow growing in Imperial, Kern, Kings and San Joaquin Counties or by approved research institution
2003	SB 420, MMP	Created medical marijuana id card requirement for medical cannabis use
2015	AB 243, AB 266, SB 643, MCRSA	Creation of MCCP (Medical Cannabis Cultivation Program) with twelve license types, implement track and trace program, creates Bureau of Cannabis Control names medical cannabis as an agricultural product and evaluate environmental impacts. No large scale until 2023
2016	SB 837, MMRSA	Continued development of regulations for nineteen licensing types, defines medical marijuana
2016	Prop 64, AUMA	Legalized adult use of marijuana, creation of licensing for commercial cultivation activities, establishes regulatory bodies, no large scale grows until 2023
2017	SB 94- MAUCRSA	Repeals MMRSA and AUMA, maintains licensing types, and creates one regulatory system for medical and adult use.

Sources: OAG (2015), CSA (2015a, 2015b), California State Senate (CSS) (2015,2017), and Stoa (2017).

Physical/Environmental Impacts and Concerns

Environmental impacts of cannabis production are of primary interest to many who research marijuana (Thompson et al. 2013; Bauer et al. 2015; Butsic and Brenner 2016; Miller 2018). These include water diversions, damage of public lands from illegal cultivation, degradation of public lands, use of electricity associated with indoor cultivation, and wildlife toxicant exposure. Bauer et al. (2015) measured stream flow of four watersheds in the northern portion of the state showing marijuana cultivation consumes significant shares of stream flow through diversions. Water demand for cannabis cultivation in three of the four study watersheds is estimated from 34 percent to over 100 percent of stream flow compared to water demand for cannabis cultivation in the fourth watershed of 2 to 23 percent; this can be explained by demand exceeding stream flow during low-flow periods and varied levels of precipitation in Northern California over the study time (Bauer et al. 2015). Nores and Swan (2010) explore the destruction of illegal marijuana plantations through the eyes of a California Department of Fish and Game warden, fighting marijuana cartels on some of California's protected public lands. Unlawful cultivation and environmental degradation cause social harm by consuming the natural beauty of Yosemite National Park through water diversions and the application of pesticides and herbicides, making affected areas unsafe to explore (Starr 2013). California Representative Jared Huffman (2018) reports that in one season at seven sites in Humboldt and Trinity Counties authorities hauled out 8,188 pounds of fertilizer, 104 pounds of rodenticide, 560 gallons of insecticide, sixty-eight ounces of concentrated Carbofuran (the most toxic carbamate pesticide) that could be mixed into sixty to seventy gallons, 205 fifty-gallon bags of garbage and eight-and-a-half miles of irrigation line. Mills (2012) investigates the carbon footprint of indoor cannabis productions. The study suggests indoor marijuana production accounts for 1 percent of national electricity use, but because it is a relatively new and growing practice it is often not accounted for when energy consumption estimates are developed. In California, indoor production claims 3 percent of total consumption or 9 percent of household energy consumption (Mills 2012). Research by Thompson (2013) shows wildlife toxicant exposure from marijuana cultivation sites in Sierra National Forest increased over the previous forty years, aiding the continued decline for the fisher (*Pikania pennant*), highlighting environmental externalities of illegal grow operations.

Spatial Analysis

Law enforcement in British Columbia used spatial analysis as a determination mechanism for combating illegal production and distribution of cannabis (Malm and Tita 2007). Geographic Information Systems (GIS) software was used to observe the success of four different enforcement tactics and crime reduction policy initiatives (Malm and Tita 2007). "Green Teams" police growing operations and use of GIS allowed enforcement agencies to show decreased growing operations and minimal displacement to neighboring enforcement jurisdictions (Malm and Tita 2007). Using high resolution satellite imagery allowed Butsic and Brenner (2016) to map the locations of greenhouse and outdoor cultivation locations in sixty randomly sampled watersheds in Humboldt County. High spatial resolution of the data made it possible for small grow sites to be identified; 4428 grow sites were identified (Butsic and Brenner 2016). Data indicated that most sites fragment landscapes because of their remoteness, the slope on which some grows are found can lead to erosion or landslides and fish habit and stream flow are threatened by water diverted for cultivation (Butsic and Brenner 2016). Bauer et al. (2015) also used high resolution aerial imagery to estimate the total number of marijuana plants grown in four study watersheds and findings were validated by information provided by law enforcement on search warrants executed and low altitude aircraft flights. Bauss (2017) analyzed Google Earth Imagery of the Redwood Creek watershed in Humboldt County and identified 303 greenhouses, one-hundred outdoor cultivation sites, one-hundred and sixty-four water tanks and fifty-one installed water ponds; ground truthing of data for accurate measures would be difficult given landowner hesitation to volunteer information after engaging in unregulated marijuana cultivation.

Rural Cannabis Economies and Qualitative Research

Exploring ways other researchers have approached cannabis cultivation through qualitative lenses shows most research with farmers occurring internationally (Cocklin, Walker, and Blunden 1999; Kepe 2003; Lenton et al. 2015) while national qualitative studies focus on regional effects of cannabis cultivation on communities (Meisel 2017; Keene 2015), such as the investigation of advertisements revealing coded language (Meisel 2017). Kepe (2003) investigated how cannabis cultivation contributed to the livelihoods of a rural South African village in the Pondoland region and communities of Eastern Cape Province despite its illegality; farmers cultivate in forests or private land homesteads, producing most cannabis consumed in South African cities. Most of the cannabis produced in South Africa is used for recreational purposes despite its documented medicinal qualities that have been used in Western and traditional treatments; cannabis was a money maker over a hundred years ago grown by white farmers who later lobbied for its ban after alleged misuse by their workers (Kepe 2013). In the late 1990s South African politicians argued that the cannabis trade could improve economies of rural communities growing hemp for fiber and oilseed but communities in the Pondoland region were excluded because it was believed that differences between the industrial and recreational species would be difficult for police to distinguish and complex topography would restrict or slow police access (Kepe 2013). Qualitative methods such as interviews and participant observation, followed by contextual analysis of *Cannabis sativa* at local and national levels, document social dynamics that exist along the cannabis commodity chain to determine price (Kepe 2003). Analysis showed that cannabis was economically beneficial for some rural communities despite limited access to transportation infrastructure or lack of consistencies in local and national legislation. Results also determined that unlike popular perception not all cannabis cultivators are wealthy. Illegality of possession and trade of cannabis are a key factor for low prices at which producers can sell crops, but the same illegality keeps prices paid for recreational use high; city dealers can make three times as much as cannabis farmers (Kepe 2003).

Cocklin, Walker, and Blunden (1999) investigated the economic and social products of cannabis cultivation in rural communities of Northland, New Zealand. Cannabis is the most used illegal drug in New Zealand and the Northland region is known as a major producer (Cocklin, Walker, and Blunden 1999). Using a commodity chain framework, the relationships between cannabis production and consumption are described and implications are identified. Review of media reports and interviews with those in the Northland community that did not cultivate cannabis reveal the downside of the cannabis industry; those who participated in the illegal cannabis cultivation industry found risk with interview too high (Cocklin, Walker, and Blunden 1999). Results support the claim that cannabis is an agricultural commodity, dictated by the laws of supply and demand, playing an active role in the economy of rural communities in Northland. Illegality of cannabis in New Zealand makes its real economic impacts difficult to calculate and acknowledge as the only difference between cannabis and more common products of commodification (Cocklin, Walker, and Blunden 1999).

A qualitative analysis assessing attitudes of predominantly small-scale cannabis cultivators towards the adoption of non-prohibitionist cannabis regulation models was conducted using online surveys (Lenton et al. 2015). The study used data collected by the Global Cannabis Cultivation Research Consortium from 1772 current or recent growers in Australia, Denmark, and United Kingdom. Results indicated that survey participants were largely male, over 60 percent believed use should be for adults only, and over 50 percent agreed that only licensed businesses should sell cannabis. Conclusions highlight the value of approaching the cannabis cultivation process and cannabis growers with respect to yield valuable insights (Lenton et al. 2015) and present opportunities for collaborative decision making with all stakeholders in the budding California cannabis cultivation industry.

Keene (2015) explored the economic vulnerability and resilience associated with marijuana production in a rural region of Northern California that the author calls “Claytown” after the collapse of the timber and mining industries, by assessing well-being. By using qualitative methods including participant observation and surveys and interviews with growers, community members and law enforcement, the findings reinforce the notion that production of marijuana is a “public secret” in Claytown. Data collected confirms that marijuana has been in the region for fifty years, beginning with homesteading back-to-landers experimenting with illegal production in the absence of economic opportunities, and is important to both rural livelihoods and the economic health of Claytown (Keene 2015). Using data from the Claytown Sherriff’s Office on marijuana plant seizures in 2008 and 2013, as well as a 2014 survey given to cultivators, Keene estimates that the industry generates around $415 million to nearly $2.5 billion annually as well as estimating that $500 million of revenue remains within the local economy. Thus, the production of marijuana remains a contested public secret in Claytown, some herald it as an economic savior and means to a living and others see it as nothing more than another noxious weed growing and pay no interest (Keene 2015).

Qualitative Methodologies

Tools such as surveys and interviews are typically used to gain a more personal perspective about or from research subjects. Using video to document geographic phenomena is an increasingly popular research method, but its full potential is yet to be realized (Pink 2007; Garrett 2010). This method captures time and place in a snapshot, allowing records to be kept in many forms (Garrett 2010,). Walking with video allows for an ethnographic approach of "experiencing, interpreting, and representing culture" (Pink 2007, 79; Garrett 2010, 530). Walking interviews capture data concerning the subject's own understanding of place and creates more site-specific data (Evans and Jones 2011). The camera can be used as a vehicle to expand an understanding of an interview subject's environment and creates a timestamp of the recorded experiences (Pink 2007).

Snowball sampling methodology is used in qualitative research to recruit participants in a random sequence (Basiouka and Potsiou 2013; Griffin, Morris, and Thakar 2016; Speer 2017). It begins with a selected group of participants who use their social networks to create a chain driven sampling design; initial contact leads to secondary and tertiary contacts, continuing a chain of interested research participants or a chain leading to a participant as research information is passed along to contacts (Griffin, Morris, and Thakar 2016). This method facilitates the inclusion and representation of a diverse range of ages, backgrounds, education and experiences within a sampled population (Basiouka and Potsiou 2013; Speer 2017). Sampling designs like snowball methodologies are fast participant recruitment techniques

(Basiouka and Potsiou 2013) and are often adopted when trying to include marginalized people (Speer 2017) or people engaged in risky or illicit behavior (Griffin, Morris, and Thakar 2016).

The literature discussed in this chapter examines the history and regulation of cannabis agriculture in California, physical and environmental externalities of cannabis cultivation and the evolution of law surrounding the cannabis industry. I found little research that analyzed cultivators qualitatively. This illustrates the growing opportunity for cannabis cultivation to be examined through qualitative lenses developing a deeper understanding of cannabis growers, at what scale they produce and why, so we can begin to understand how cannabis will change agriculture in California and define it as an agricultural product. This research is intended to contribute to filling that research gap.

CHAPTER 3

METHODOLOGY

Agricultural geography looks to reveal the spatial variations of agriculture and the reasons for them; popular products for agricultural geographic research are maps and diagrams (Gregor 1970). Currently most of the academic work about marijuana, classified by the federal government as a Schedule I drug, centers on negative impacts of its production, including illegal water diversions, degradation of public lands and increased chemical runoff (see Chapter 2). Many environmental effects of illegal marijuana production are analyzed, but outside of illegalities and production effects, little academic work explores the people who cultivate the plant in the United States. These research deficiencies fail to consider the agricultural struggles of rural Californians who returned to the land and sustained communities through the cultivation of marijuana in “the local economy.” This points to the need for a study that examines farmers in California that participated, participate and will participate in an economy created in the shadows.

Spatial Analysis: The New Ganjapreneurs

Spatial analysis was performed to illustrate patterns of distribution for interest in cannabis cultivation business licenses. My analysis was based upon data gathered from a survey given by a division of the California Department of Food and Agriculture, CalCannabis Cultivation Licensing (CDFA), on the interest of cannabis business licensing types by county in August of 2016 (CDFA 2017a; see Appendix A). Similarly, data concerning the legality of cannabis cultivation on unincorporated lands as controlled by county regulations and ordinances under MCRSA from the website Cannabusinesslaw.com (2018) show varied composition of cannabis cultivation regulations across California’s 58 counties. All data gathered from these surveys were organized in an Excel sheet and imported into ArcMap™ for interpretation. To show the distribution of cultivation legality on unincorporated lands each county was classified Approved, Banned or Pending (see Appendix B).

The CDFA survey polled people interested in cannabis cultivation with questions about 17 different license types, and received 23,253 responses. It maps the distribution by county, based on the total number of responses. My research is only interested in the cultivation of cannabis, and examines dispersal of 12,964 survey responses, disregarding data gathered from ganjapreneurs interested in pursuing business licenses for cannabis distribution, manufacturing cannabis products, retail spaces or transporting raw cannabis and/or cannabis products (see Table 3). The responses for each cultivation license group type were analyzed to identify which counties are most interested in each of the four scales of production: Specialty, Small, Medium, and Nursery production (see Table 2). There were no survey data available for San Benito County.

Data for the legality of cannabis cultivation on unincorporated areas was gathered from CannaBusinessLaw (2018). CannaBusinessLaw is a legal corporation specializing in medical marijuana business law. Counties are classified as Approved, Banned or Pending based on the county's cannabis cultivation laws in April 2018; a third map was made to identify counties that have changed laws regarding cannabis cultivation on unincorporated lands since Proposition 64 was passed in California and MAUCRSA from data gathered in April 2017.

Qualitative Analysis: Emerging from the Shadows

A review of cannabis industry publications and attending cannabis cultivation conferences and events helped to conceptualize the industry participants and their motives for cannabis cultivation. Interviews with six current and prospective cannabis cultivators were conducted after securing approval from the California State University Long Beach Institutional Review Board in June 2017. As there is little recorded history of marijuana in California before the legalization of medical use, much if not all of what will be known is through narratives and anecdotes told by communities hidden in the shadows of Redwood giants. Adopting snowball recruitment methodologies allowed for a diverse sample of research participants (Basiouka and Potsiou 2013; Griffin et al. 2016; Speer 2017). I adapted the method "walking with video" (Pink 2007) and in-person interviews rather than conducting online surveys as Lenton et al. (2015). Interviews conducted with current cannabis farmers and people interested in entering the commercial cannabis industry draw a comparison of differing ideas between small-scale and large-scale farmers, cultivation community dynamics, and motives that keep or lead people into the Green Rush. For those who were not comfortable being video recorded, interviews were recorded with a digital audio recorder or hand-written notes by conducting traditional interviews with cannabis farmers (Cocklin, Walker, and Blunden 1999; Kepe 2003) and interested ganjapreneurs. Participant observation is also a useful technique that has been adopted by those who study cannabis by adopting autoethnographic techniques to describe a population from within (Cocklin, Walker, and Blunden 1999; Keene 2015; Kepe 2003) and is included in this research to illustrate my own experiences within the local economies in the Central Valley and Emerald Triangle and bring light to my positionality within the research.

Ideal interview participants were male or female English speaking, current, former or prospective cannabis cultivators. Participants were recruited using a snowball recruiting methodology. Recruitment fliers were given to snowball contacts – a Central Valley farm labor contractor, a Santa Barbara in-home cannabis consultant, a Humboldt County Cannabis Planner and personal contacts made while attending Cal Poly, San Luis Obispo and growing up in the

Central Valley – who distributed fliers to current or prospective cannabis cultivators. Interested interview participants contacted me and were issued a research participant consent form and a list of proposed interview topics (see Appendix C). The use of pseudonyms and altering faces and voices of participants protected their anonymity in the event interview data is subpoenaed. For participants who did not consent to the interview being audio or video recorded, a face-to-face semi-structured interview occurred at a venue of participant's choice, their farm or another location. Interviews ranged from 20 minutes to 3 hours.

As scholars begin to consider research into marijuana in California they must consider the emotions and scars cut into the psyches of marijuana farmers in the Emerald Triangle and elsewhere in the state. I approach this research from the perspective of working "in concert with" research subjects (TallBear 2014, 3). Indigenous scholar, Kim TallBear (2014) challenges researchers to "think creatively about the research process as a relationship building process" (2). This approach invites scholars to "stand with" communities of interest to produce knowledge in concert with the needs and interests of local communities (TallBear 2014, 2). Collaboration often transforms the two colliding entities (Tsing 2015) and my research models this approach of standing with communities of interest to transform the way scholars do research by engaging the cannabis cultivation process and community with respect to produce more pertinent data (Lenton et al. 2015).

My approach to studying cannabis farmers was to engage within their community, rather than as an outside observer. Through working within the "local economy" of Humboldt County and having grown up on a farm in the Central Valley I found little difficulty inserting myself as a part of both communities while conducting interviews and "standing with" my community as someone looking to tell the story of cannabis cultivation in California and that of farmers in the

Central Valley continuing their tradition of tilling the soil to support families. I look to articulate overlapping agricultural geographies of an agricultural product already heralded as the next California commodity by big business in agriculture and beyond (Bennett 2018).

CHAPTER 4

RESULTS

Spatial Analysis: Survey Data

The CDFA survey had seventeen cannabis industry license types that participants could choose to indicate their interest. Ten of the license types were for the cultivation industry and varied based on size (specialty, small, medium and nursery) and cultivation method (outdoor, indoor, or a mixed-light operation) (see Table 2). There are three primary methods of cannabis production: indoor with the use of artificial lighting, outdoor with natural sun, and mixed-light methodologies (Butsic and Brenner 2016). Outdoor cultivation methods grow cannabis outside of a building, without the use of artificial lighting and typically in natural soils; plantings start from seeds or from rooted cannabis cuttings taken from a larger plant, a "mother" of sorts that clones herself. CDFA describes cultivation as follows (Horizon Water and Environment 2017): outdoor cannabis can be grown directly in ground, in raised beds, fabric pots or plastic grow bags; planting in early spring and harvesting in the fall between mid-September to November allows for one crop per year. Indoor cultivation methods grow cannabis inside a building with the use of artificial lighting "to create an environment that maximizes the quantity and quality of cannabis flower buds produced" (Arnold 2013 cited in Horizon Water and Environment 2017, 3-5) typically from rooted cannabis clippings. The use of artificial lighting allows farmers to mimic the changing of the seasons at a faster rate and allows plants to accelerate through the vegetative and flowering growth stages, altering the photoperiod. This greatly affects the amount a farmer can produce in a year, up to five growth cycles. Varied methods of indoor cultivation have been adopted and include the use of hydroponics or growing cannabis plants in soil or another medium such as peat moss. The use of artificial ventilation and climate control are critical to prevent the development of molds or create favorable environments for pest (Horizon Water and Environment 2017).

The mixed lighting method of cannabis cultivation involves the use of artificial lighting and sunlight typically within a greenhouse structure (Horizon Water and Environment 2017). Through the aid of tarps, the photoperiod is altered to hasten the growth and flowering cycle to yield multiple crops per year, starting crops from seeds or rooted clippings (Horizon Water and Environment 2017). Nursery operations refer to cannabis cultivation operations that exclusively produce rooted cannabis trimming that are delivered to farms or retail dispensaries in a vegetative, pre-flowering growth stage (Horizon Water and Environment 2017). All methods usually apply nutrients as a compost tea where nutrient mixtures are diluted in water to fulfill nutrient needs (Horizon Water and Environment 2017).

TABLE 2. CDFA Survey Cultivation Types

Type:	**Type 1**	**Type 1A**	**Type 1B**	**Type 2**	**Type 2A**	**Type 2B**	**Type 3**	**Type 3A**	**Type 3B**	**Type 4**
Industry:	Cultivation									
Category:	Specialty			Small			Medium (limited licenses allowed)			Nursery
Details:	Specialty outdoor- up to 5,000 sq ft, or up to 50 mature plants on non-contiguous plots	Specialty Indoor – up to 5,000 sq ft	Specialty Mixed-light – up to 5,000 sq ft	Small Outdoor – 5,001 to 10,000 sq ft	Small Indoor – 5,001 to 10,000 sq ft	Small Mixed-light – 5,001 to 10,000 sq ft	Medium Outdoor – 10,001 sq ft to one acre	Medium Indoor – 10,001 to 22,000 sq ft	Medium Mixed-Light – 10,001 to 22,000 sq ft	Nursery Outdoor /Indoor/ Mixed-Light – up to one acre; license holders may also transport live plants
Licensing Authority	CDFA									

Sources: CDFA (2017a, 2017c).

Additional industries ganjapreneurs could indicate interest in were cannabis businesses involved with manufacturing cannabis derived products, testing cannabis for potency and chemical residues, retail dispensaries, distribution and transportation (see Table 3).

TABLE 3. Other CDFA Survey Types

Type	Type 6	Type 7	Type 8	Type 10	Type 10A	Type 11	Type 12
Industry	Manufacturing		Testing	Dispensary		Distribution	Transportation
Details	Manufacturing using non-volatile solvents	Manufacturing using volatile solvents	Test for THC, cannabinoids, contaminants, microbiological impurities, among other compounds listed in Business & Professions Code § 19344.	General	No more than three retail sites	All cultivation (Types 1-4) and manufacturing licensees (Types 6-7) are required to send their products to a Type 11 licensee where their cannabis products will be inspected for quality assurance before the products pass to the next stage of manufacturing or retail. Type 11 licensees must also send the cannabis products to a Type 8 laboratory for batch testing and certification.	Only Type 12 license holders can transport cannabis or cannabis products between licensees, such as cultivators and retail outlets.

Note: MCSB = Manufactured Cannabis Safety Branch, Department of Public Health; BCC = Bureau of Cannabis Control; DCA = Department of Consumer Affairs; Sources: CDFA (2017b, 2017c).

The results from the CDFA survey include 23,253 responses (see Appendix A, CDFA 2017a), 14,277 (61 percent of all responses) indicate interest in cannabis cultivation licenses (see Figure 2). Interest in businesses transporting cannabis had the second most responses with 10 percent, followed by manufacturing and distribution both with 9 percent, an 8 percent interest in cannabis dispensaries and the remaining 3 percent of survey participants showed interest in testing cannabis products.

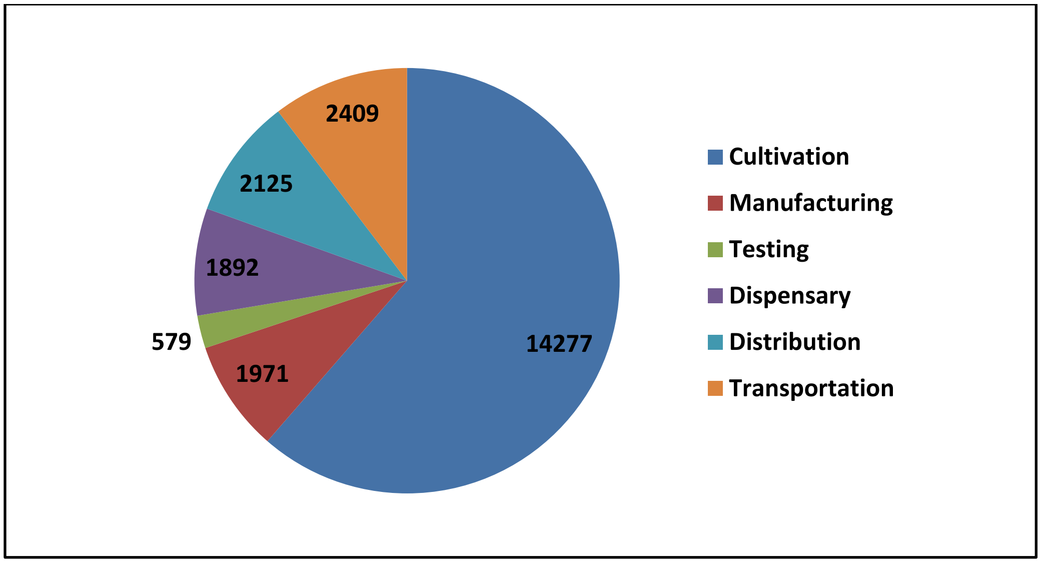


FIGURE 2. Total CDFA survey responses by license category type.

The smallest cultivation license, Specialty, was in the highest demand for interested ganjapreneurs statewide with 37 percent of all cultivation interest responses, followed by Medium license types (27 percent), then Small license types (26 percent), and Nursery size licenses (10 percent) (Figure 3).

The largest concentrations of interest in cannabis cultivation come from southern California. The ten most interested counties in cannabis cultivation and their responses are shown in Figure 4. Total cultivation survey responses in Humboldt were 431(3 percent of cultivation responses), and eighty-one survey responses in Merced County (0.6 percent of 0cultivation responses).

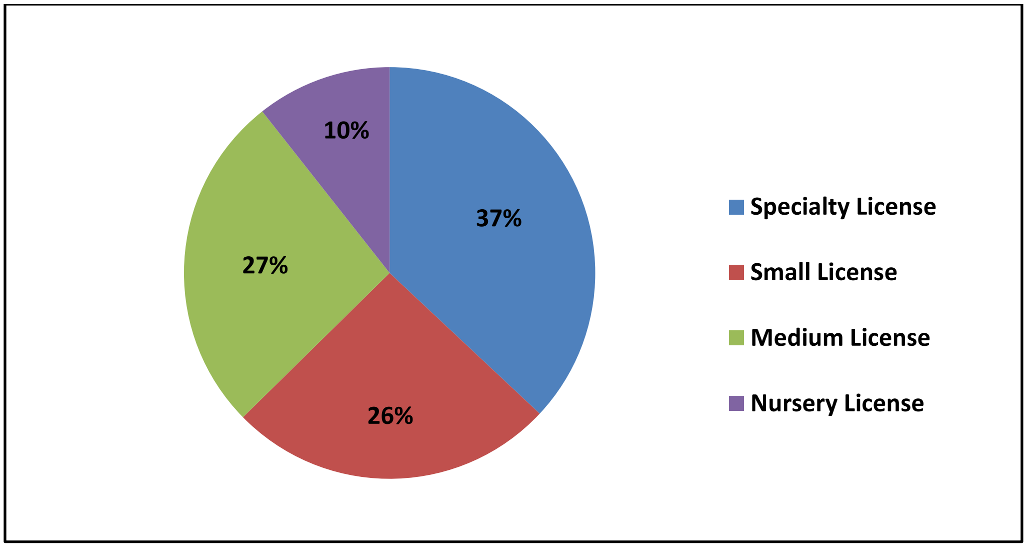


FIGURE 3. CDFA survey interest responses by cultivation size.

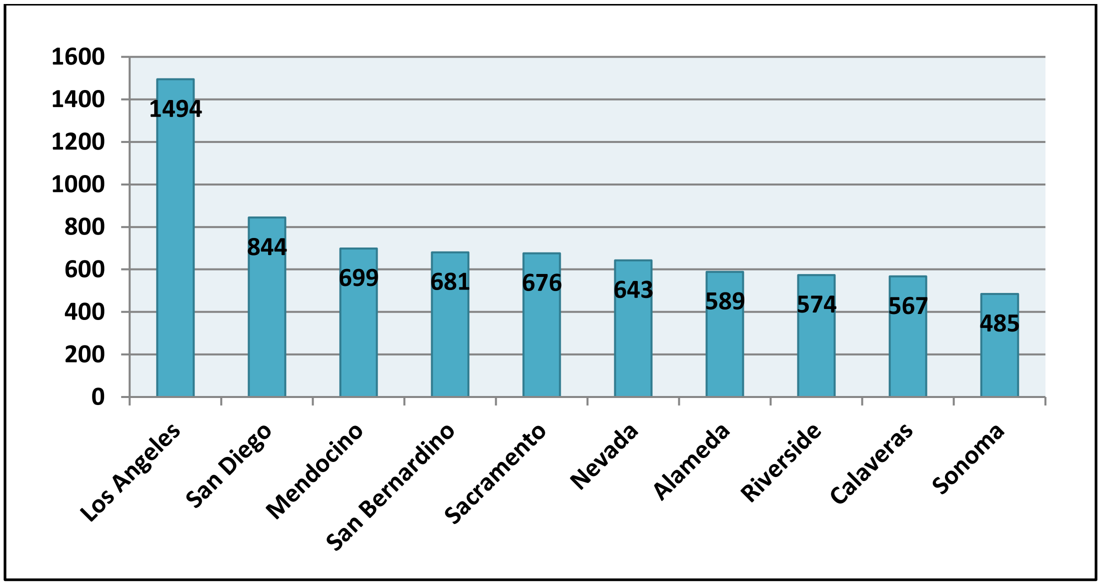


FIGURE 4. California counties most interested in cannabis cultivation.

The top ten counties interested in specialty sized cultivation operations with the number of responses are shown in Figure 5. Los Angeles County had the most responses. The number of responses from Humboldt and Merced counties was 172 and twenty-four respectively out of 5279 responses.

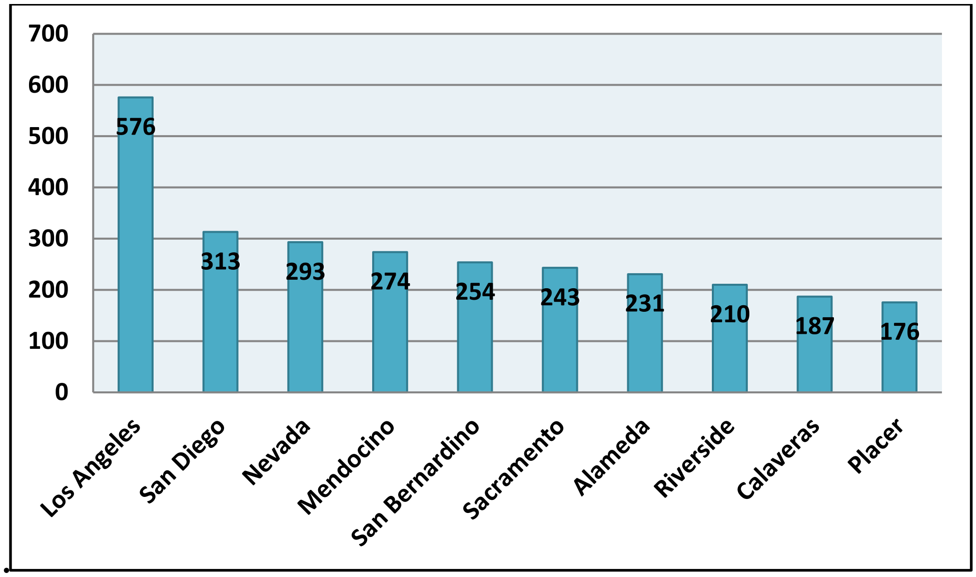


FIGURE 5. Counties most interested in specialty size cultivation operations.

Top ten counties interested in small sized operations with number of responses are shown in Figure 6. Los Angeles again had the highest response rate. The responses in Humboldt and Merced counties are eighty-nine and twenty-two respectively out of 3664 total responses for interest in small sized cannabis cultivation operations.

The top ten responses for medium sized operations with number of responses are seen in Figure 7. Los Angeles tops all other counties in California with the most responses. Survey responses in Humboldt and Merced counties were 119 and twenty-six respectively.

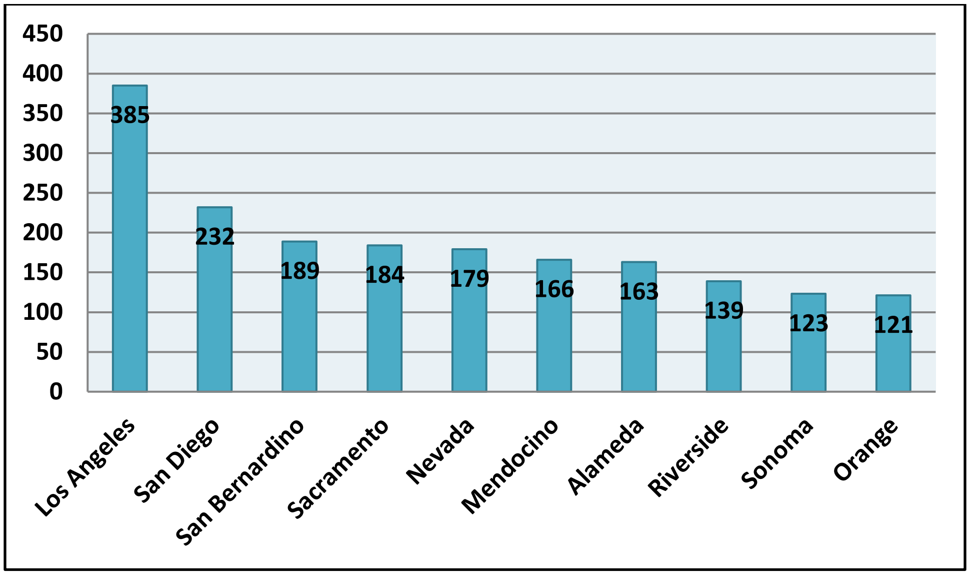


FIGURE 6. Counties most interested in small size operations.

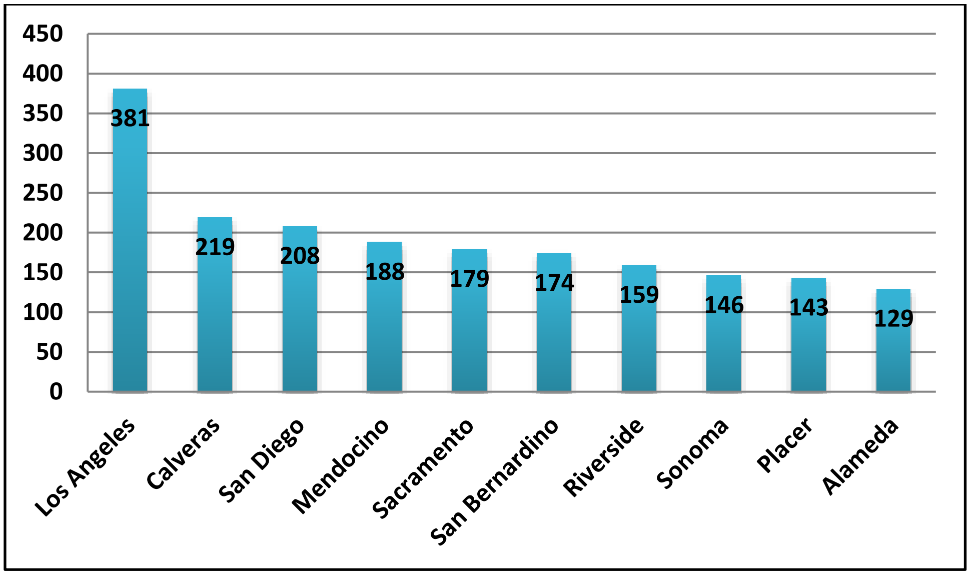


FIGURE 7. Counties most interested in medium size operations.

The top ten responses for nursery size cultivation operations are illustrated in Figure 8. Los Angeles showed more interest than any other California county for operating nursery sized cannabis cultivation sites. Humboldt County finally appeared in the top ten counties of all responses for this cultivation operation size. Nine people showed interest in operating a nursery sized commercial cannabis cultivation site in Merced County out of 1518 responses for interest in nursery cannabis cultivation operations.

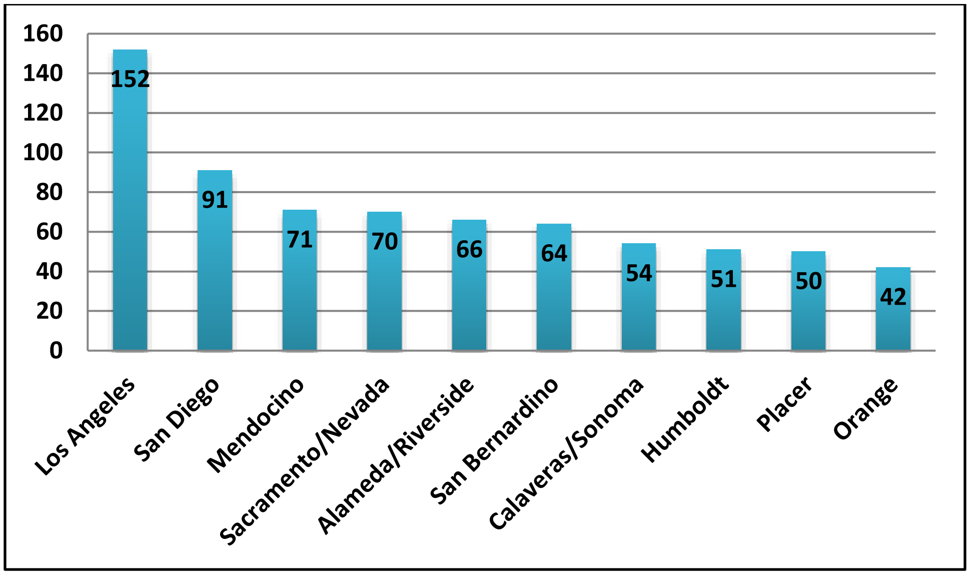
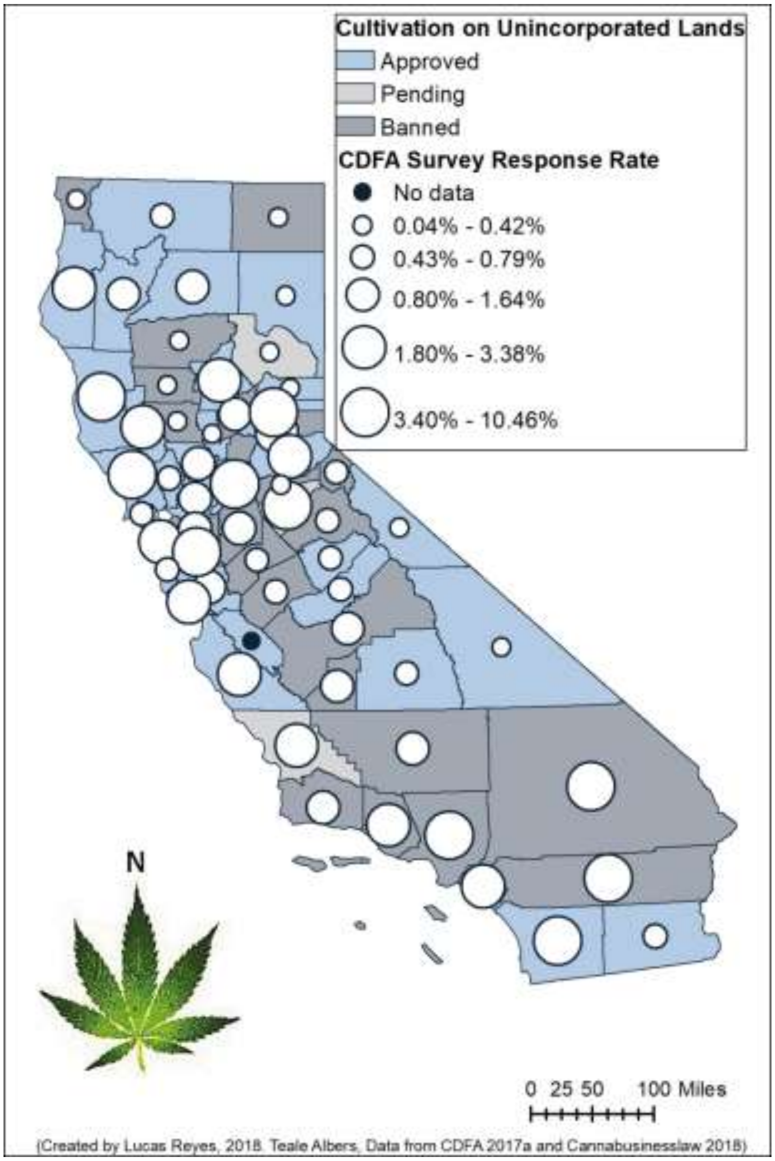


FIGURE 8. Counties most interested in nursery operations.

The number of CDFA cannabis cultivation interest responses are identified as circles whose size vary based on the number of responses from each county compared to the total number of responses, larger circles are counties with more survey responses and vice versa. The largest concentration of approved cannabis cultivation on unincorporated lands is in Northern California (see Figure 9). It is legal in Butte, El Dorado, Humboldt, Lake, Lassen, Napa, Nevada, Sacramento, Shasta, Sierra, Siskiyou, Solano, Sonoma, Sutter, Trinity and Yolo counties (see Appendix 2). It is banned in Amador, Colusa, Del Norte, Glenn, Modoc, Placer, Tehama and

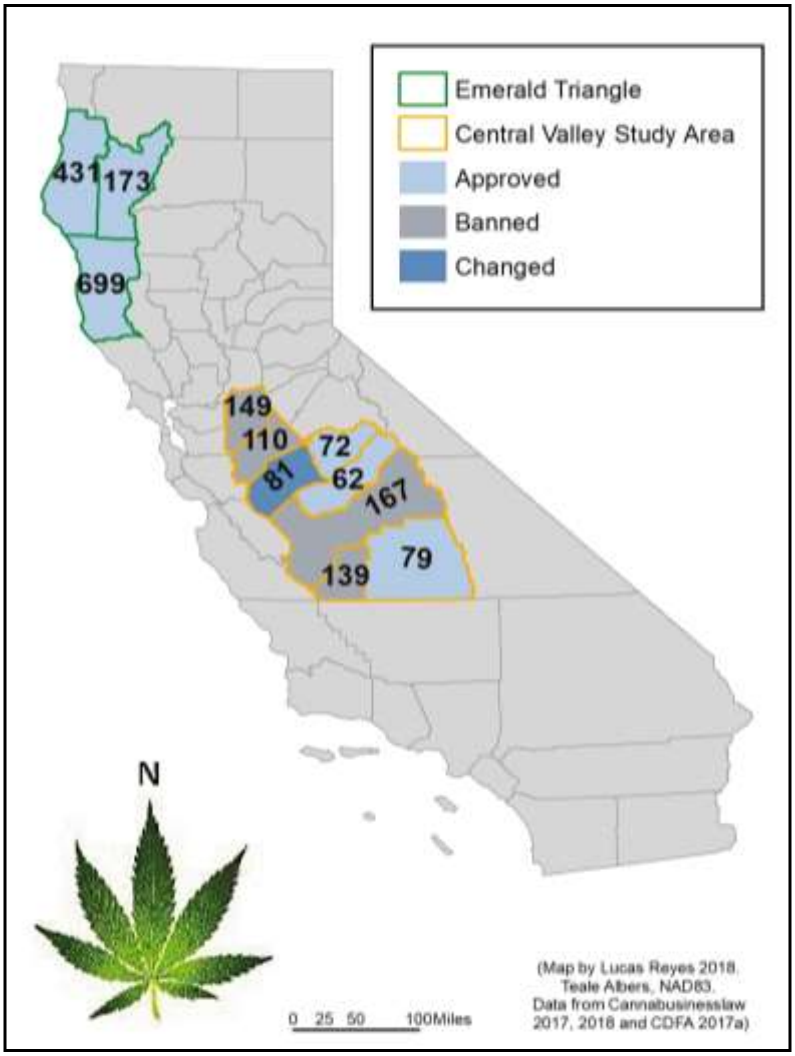
Yuba counties and legality is pending in Plumas County. Moving south in California cannabis cultivation on unincorporated lands becomes more regulated and is banned in Kern, Los Angeles, San Bernardino, Santa Barbara and Riverside counties, and is pending in San Luis Obispo. Counties east of the San Joaquin Valley also largely approve cannabis cultivation on unincorporated lands, with approval status in Inyo, Mariposa and Mono counties, while cultivation is banned in Alpine and Tuolumne counties, and pending in Calaveras County.

Cannabis cultivation on unincorporated lands in the Emerald Triangle is approved in all three counties, with nine percent of all survey response; the largest of the Emerald Triangle Counties with interest in cannabis cultivation licenses is Mendocino County, with 616 responses (see Figure 9). The legality of cannabis cultivation on unincorporated lands of the San Joaquin Valley is more varied, with six percent of all CDFA Survey responses. It is illegal to cultivate on unincorporated county lands in the four counties in the Central Valley with the highest cannabis cultivation license interest: Fresno, Kings, San Joaquin, and Stanislaus (see Figures 9 and 10). Cannabis cultivation on unincorporated lands is also now not legal in Merced County, where the Bowles Farming CEO mentioned in Chapter 1 hopes to plan 200 acres of cannabis. Merced County was the only county included in the study that changed regulation from Approved to Banned (see Figures 9 and 10). In the Central Valley it is legal to grow on unincorporated lands in Mariposa, Madera and Tulare Counties (see Figures 9 and 10).



(Created by Lucas Reyes, 2018. Teale Albers, Data from CDFA 2017a and Cannabusinesslaw 2018)

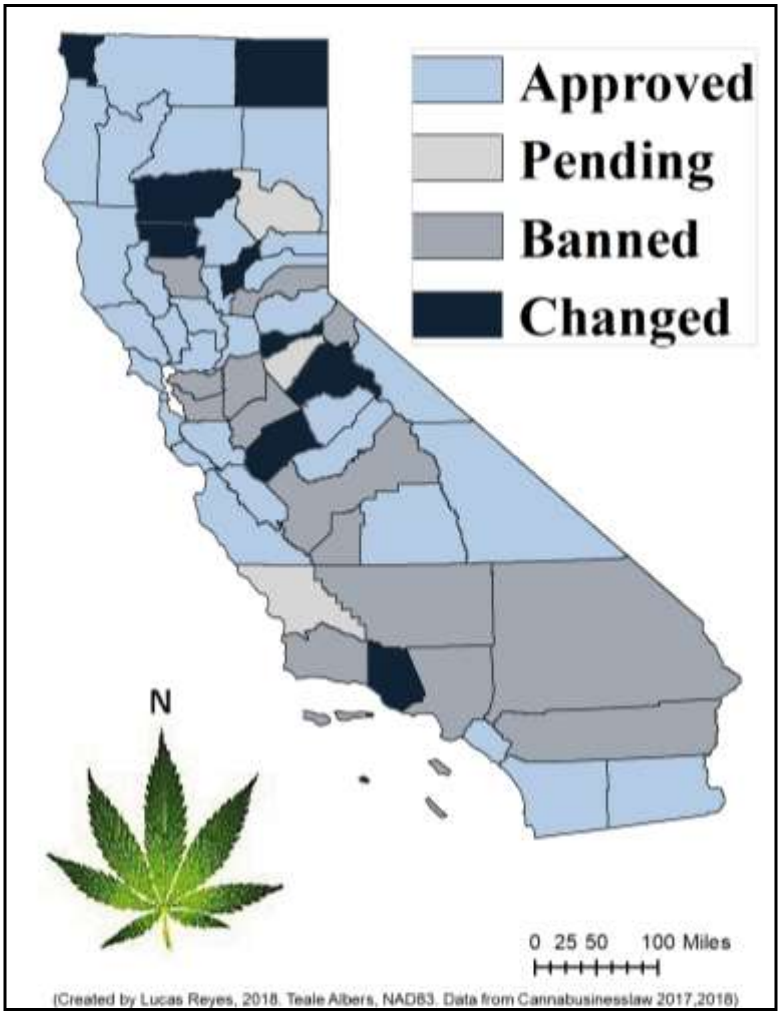
FIGURE 9. CDFA cultivation interest survey responses and cultivation regulations on unincorporated lands by county.



(Map by Lucas Reyes 2018, Teale Albers, NAD83, Data from Cannabusinesslaw 2017, 2018 and CDFA 2017a)

FIGURE 10. Total CDFA cultivation survey responses and changes in regulation, 2017-2018, study areas.

Data for the regulation of cannabis on unincorporated lands was first gathered April 2017. In one year, nine counties moved to make the cultivation of cannabis illegal on unincorporated lands (see Figure 11). Amador, Del Norte, Glenn, Merced, Modoc, Tehama, Tuolumne, Ventura and Yuba counties all switched from approved regulations to banning cultivation of cannabis on unincorporated lands.



(Created by Lucas Reyes, 2018. Teale Albers, NAD83. Data from Cannabusinesslaw 2017,2018)

FIGURE 11. One-year changes of cannabis cultivation regulations on unincorporated lands from approved to banned, March 2017 to April 2018.

TABLE 4. Additional CDFA Cultivation License Types Not Included in Survey

Industry:	Cultivation						
Category:	Specialty Cottage			Processor	Large		
Details:	Specialty Cottage Outdoor- up to 25 mature plants	Specialty Cottage Indoor- up to 500 sq ft or less of total canopy	Specialty Cottage Mixed-light- 2500 sq ft or less of total canopy	Processor-cultivation site that only processes cultivated cannibis by curing, dryinh, grading, packaging or trimming of cannabis and nonmanufactured cannabis products	Large Outdoor- more than one acre of total canopy size on one premises	Large Indoor- more than 22000 sq ft total canopy size on one premise	Large Mixed-light- maximum threshold TBD for more than 22000 sq ft total canopy size on one premise

Sources: CDFA (2017b, 2017c).

These are additional cannabis cultivation licenses available to ganjapreneurs (Table 4). Specialty Cottage and Processor were added in MMRSA (Table 1) and large production sizes have always been in legislation since licensing talk began but are not permitted until January 1, 2023.

Qualitative Analysis: Personal Perspectives

Six interviews were conducted with farmers over one year, 2017-2018 (Table 5). The first three interview participants were in Humboldt County; two legacy cannabis growers with over fifty years combined cultivation experience and an enthusiastic cannabis cultivator that will be growing cannabis legally for another legacy Humboldt cannabis cultivator. Three snowball contacts in different geographic extents of California distributed recruitment fliers. Yet, uncertainty over the last year of how the cannabis industry would be regulated made many hesitant to talk about entering or becoming compliant with new laws or even considering the cannabis industry as a business prospect. Two Central Valley farmers showed interest to participate in this research, but as tomato planting and harvesting season came and went so did their interest in entering the cannabis industry. Just talking about cultivating cannabis was enough for one of the interview participants to receive a warning from his bank. The first three interview participants are linked to legacy growers who ventured to the Emerald Triangle in the first Green Rush and grew cannabis to subsist in a depressed local economy. The latter three interviews were conducted with farmers in the Central Valley, including two managers of diversified row cropping operations in Merced County and one dairyman in Tulare County. Five interview participants were male and the oldest participant, a female. One interview participant permitted an interview walking with video, four participated in audio recorded interviews and one agreed to a traditional pen and paper interview.

Fear of prosecution was the largest hurdle I faced recruiting interview participants. Even after receiving the green light from CSULB IRB to use pseudonyms, the shadows that incubated the emerging cannabis industry in California kept many wanting to stay hidden and untrustworthy of anyone coming at them with a pen. My approach always started by qualifying myself as a Central Valley native who grew up on a farm and as an alumnus of Humboldt State University with experiences working in “the local economy.” Just these few words were enough to convince research subjects I had never met to speak with me. I was able to “stand with” the interview participants as someone they could have grown up with or manicured cannabis next to.

TABLE 5. Interview Attributes

Name	Interview date	Interview type	Location	Status
Donny	July 2017	Walking with video	Humboldt County	Fined for illegal grows
Gary	October 2017	Audio	Humboldt County	Application withdrawn
Cash	October 2017	Audio	Tulare County	Waiting for descheduling
Sally	April 2018	Pen and paper	Humboldt County	No longer pursuing
Danny	May 2018	Audio	Merced County	Waiting for descheduling
Troy	May 2018	Audio	Merced County	Waiting for descheduling

Obtaining research participant trust is paramount when talking to cannabis farmers or any other marginalized or hidden peoples from society (Cocklin et al. 1999; Keene 2015; Kepe 2003).

Donny: Cannabis Cloning and Transplanting Consultant

I meet Donny outside a workshop adjacent to a residence in Humboldt County and I was immediately struck by a dank aroma of wet pine and skunk. There were cannabis plants of all sizes. Donny called this barn like workshop his nursery, a place where he housed the “mommas” from which he cloned new cannabis plants to be grown in greenhouses. He farms for his mentor, a legacy grower born in Humboldt County who has cultivated cannabis for over twenty years.

Donny cultivated cannabis previously for personal use with a MMC, a product of Prop 215 and SB 420.

Before we begin an interview walking with video Donny shows me around the large barn that houses cannabis plants in all stages of growth before budding of resin rich flower; plants are ready to go in the ground and continue a vegetative stage in a greenhouse using a “light-dep” method. Light deprivation (light-dep) cannabis cultivation methodology is also known as mixed light cultivation. This involves growing cannabis in a greenhouse with full sun to encourage cannabis plants to increase in size and then tarping the greenhouse for a 12-hour light and darkness rotation that encourages cannabis plants to flower. Tarping is typical for cannabis laborers on “the hill” or “the mountain” as he refers to it. He says that typically cannabis farmers want to plant in May and add plant matter all June, so they can start tarping in July and three or

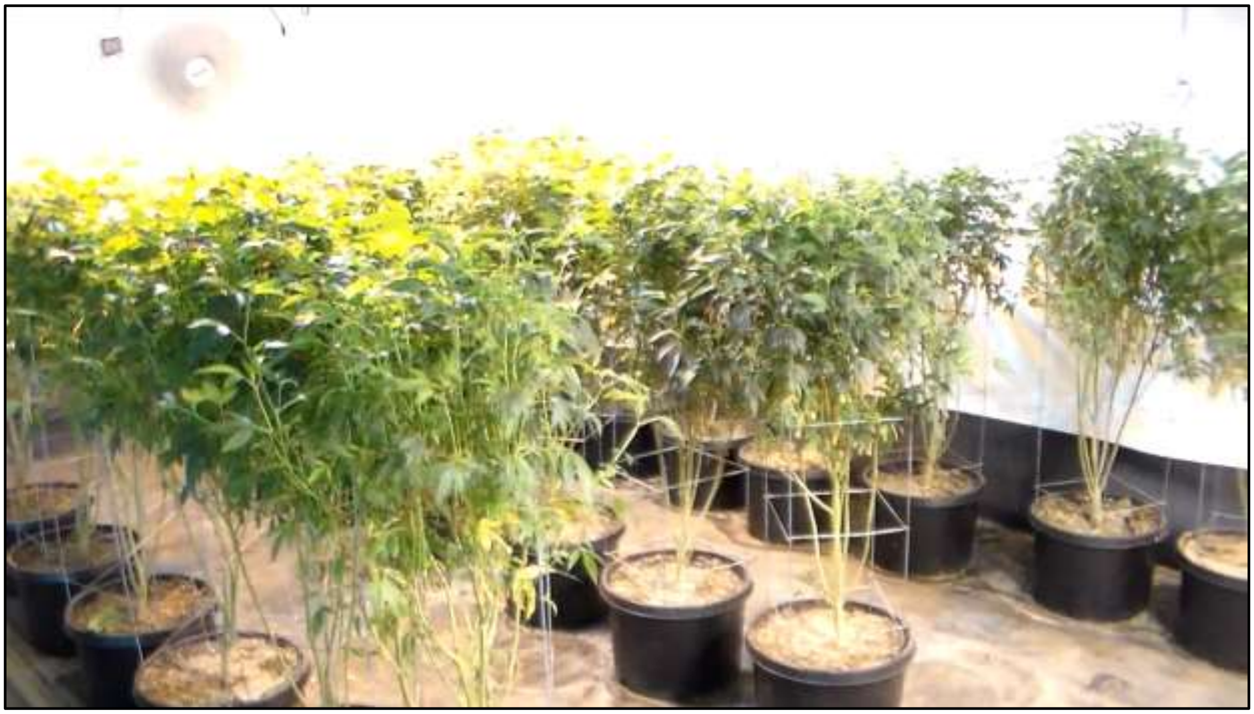


FIGURE 12. "Momma" plants used for cloning cannabis in nursery (Photo by author (2017).

four weeks later, buds are ready to be cut and dried. The property was quite large, a five acre plot that looked well-suited to plant cannabis for a total growing size of one acre. Grabbing a hand full of soil, I judge that is a near perfect loam, ideal for the field of green around the residence and workshop. Several greenhouses will be erected on the property and Donny and his mentor are patiently waiting for Humboldt County to issue their cultivation permit before they can apply for a permit to cultivate from the state.

While Donny waits for the green light, the cannabis market in California continues to be inundated with cannabis. “So much cannabis in California, it’s ridiculous,” Donny observes. He uses a hamburger analogy to describe the current state of the cannabis industry for legacy cannabis growers like his mentor:

> I have a burger that I make, and I take a lot of pride and it’s a little bit more expensive that other burger places but it’s a great burger. Whereas, my competitor comes in and sells a burger for half the price. Ultimately his burger is not going to be as good as mine, right, but people are still going to go there and buy it because it’s cheaper. It’s just an alternative and I’m not saying that’s a good or bad thing but when it happens three times, four times, five times pretty soon you’re being consumed by other burger places. How are you and any of those other people thriving?

Donny takes pride in what he grows and strives to make the best product, “medicine, ‘good stuff,’ for patients in need.” He has “lifted his bags of dirt,” in the cannabis industry, spending many weeks on the mountain; his love and interest in cannabis is a real motivator to enter the legal green rush as a mentee to a legacy farmer. Despite all of the inferior product entering the industry, he still has faith in the future of California cannabis and knows it will be a struggle; many who have been cultivating in the shadows of the redwoods are walking away.

"A lot of people are just giving up and they're moving on because they don't see a very big future in it and it's kinda sad. I have faith I can make a decent burger."

On a telephone follow up in June 2018, Donny indicates that his mentor is no longer pursuing licensing at this time. Three of his illegal grow sites were fined by Humboldt County for unpermitted cannabis grows costing him upward of $60,000 and there has not been a single greenhouse erected on the property.

Gary, 30-Plus Year Cannabis Farmer

I meet Gary at a diner for an audio interview. He begins the interview telling me about his family and their history in Humboldt County. Cannabis cultivation is not a family pastime, but he does mention there was a time when his family made moonshine, "growing corn to make their own booze," to cut cost for a family with sixteen children. He tells me that cannabis has been in Humboldt for seventy years and really took off after the floods of 1963-1964 when people ran from their land thinking that such floods would become common. "The hippies came in and they would take land and put a little cabin or little slab of slate. That's how they got imbedded."

These people were the legacy growers and back to landers (Bauss 2017, Meisel 2017) that I have heard so much about, many people heading north to avoid the Vietnam War. After the floods the land was cheap in flood areas banks weren't loaning money unless a structure was constructed on the property, "so that's how pot got into land."

Gary was a timber man for twenty-five years before he started cultivating cannabis and that is how he got into the cannabis trade over thirty years ago. After logging property timber fallers knew that land owners would not return for some time and seized the opportunities to utilize the cleared land: "After logging, we'd grow pot." He grows in Humboldt County and has grown in Shasta County and started growing from seed. The industry changed in 1972, when growing seedless (sinsemilla) became the method of choice and cloning became a common practice. This was the beginning of indoor growing and drastically increased the quality and potency of cannabis by increasing THC content.

Costs are becoming a leading obstacle for any current cannabis farmer cultivating in Humboldt County. A colleague of Gary joins us, Chris, who is a third-party issuer of water permits in Humboldt County. He and Gary both see environmental degradation from illegal grows regularly, and the worst offenders tend to be people they described as local Humboldt “white trash.” When asked about labor in the cannabis industry and trimmigrants Gary says:

> They [Bulgarians] will buy a piece of property and they will grow on it. And then they will have relatives that come over on a visa. There’s lots of them coming in. And they grow for their six months and then they go back. And a lot of them get paid about $5000 a month to work. Five thousand dollars is a lot of money in Bulgaria apparently, I’ve been told, I don’t know. I’ve never been there, but it’s quite a bit of money. Their land is a lot like ours here, in Humboldt. And then they come here and it’s a lot like home, out there in the hills. They’re like, “This is home. This is what we got. We don’t have as big of trees, but we got some good shit there.” I would say they are one of the top buyers [of property] on Highway 36 right now.

When asked about the future of cannabis in a post-prohibition regulation scheme, both Gary and Chris bring up Humboldt’s physical geography as a challenge. They describe Humboldt as being, “at the mercy of summer (weather conditions, either too much precipitation or too cloudy with little sun),” which they see as the leading hurdle cannabis cultivators in the

Emerald Triangle will face when competing with other California grown cannabis. Gary tells me, "You're going into unknown (research) territory."

Both he and Chris are curious to see what roles Central Valley and agribusiness will take in commercial cannabis cultivation and agree that no one really understand what growing cannabis takes, until they enter into the cultivation process and realize the difficulties involved.

> Some of these guys that have big ideas, when they get into [cannabis cultivation] and they see the process of all of it, they're gonna think back and go, "I think I might scale back a little bit. Growing alfalfa is a lot easier than this."

In June 2018 I spoke with the Humboldt County Cannabis Planner that was snowball contact that worked on Gary's application. He withdrew his application with for a cultivation license with Humboldt County five days before my contact for a follow-up interview. Gary indicated that cost and compliance requirements were excessive; an ADA compliant wheelchair ramp was needed to bring a drying structure on his property to code, with associated costs upward of ten thousand dollars.

Sally Seedless, 40-Plus Year Cannabis Farmer

I venture west of U.S. Route 101 to interior Humboldt County and come to a place where paved road ends and tree cover thickens after crossing bridges and driving adjacent to both a Northern California river and green, glistening, rolling hillsides. Slowly climbing a tree-covered dirt road on a hillside and passing fenced parcels of land, the remoteness of the area becomes apparent: I've come upon "The Hill."

Sally greats me high on the hillside and takes me across her property for a traditional pen and paper interview. She practices permaculture, conserving finite water from a ground well on her multi-acre homestead parcel. Her neighbors share parcels of similar size, making up a remote neighborhood of residents living on their own piece of Humboldt wilderness. Sally is a legacy grower and back-to-lander, joining many others leaving the quickly urbanizing San Francisco Bay region of the early 1970s and has called Humboldt County home since. She started growing cannabis in 1975 and remembers mothering plants grown from seeds, hidden under cover from hardwood and conifer forest stands.

Her property gives a 270-degree view of what she calls “the bowl,” where several Humboldt hills converge, and views of Kings Peak, Pratt Mountain and Bear Butte are the background to forested hillsides and greenhouses appearing on patches of cleared land for structures, usually a dwelling with a building or two used in the production of cannabis (see Figure 13).

She states that more cannabis structures have appeared as the legalization of cannabis grew closer. Cannabis has been farmed in this rural neighborhood for decades and Sally, similar to previous interviewees, reaffirms that compliance in the new legal cannabis era is costly. Many of her neighbors are moving towards business models in the times of non-prohibitionist cannabis legislation that will bring their cannabis cultivation practices into compliance, but the days of the $5000 pound are long gone, and most will have to continue illegal operations concurrently to stay above water. She takes me down to her grow site, where wild plants now occupy the grow bags spotted on a parcel of land that fits about 45 plants when they are fully mature (see Figure 14).

Planting time is near and costs to enter the legal marijuana cultivation market are so high that she is facing the reality that she may lose her home of more than forty years. Sally has neighbors and friends who are going through the compliance process. They have spent $30,000-

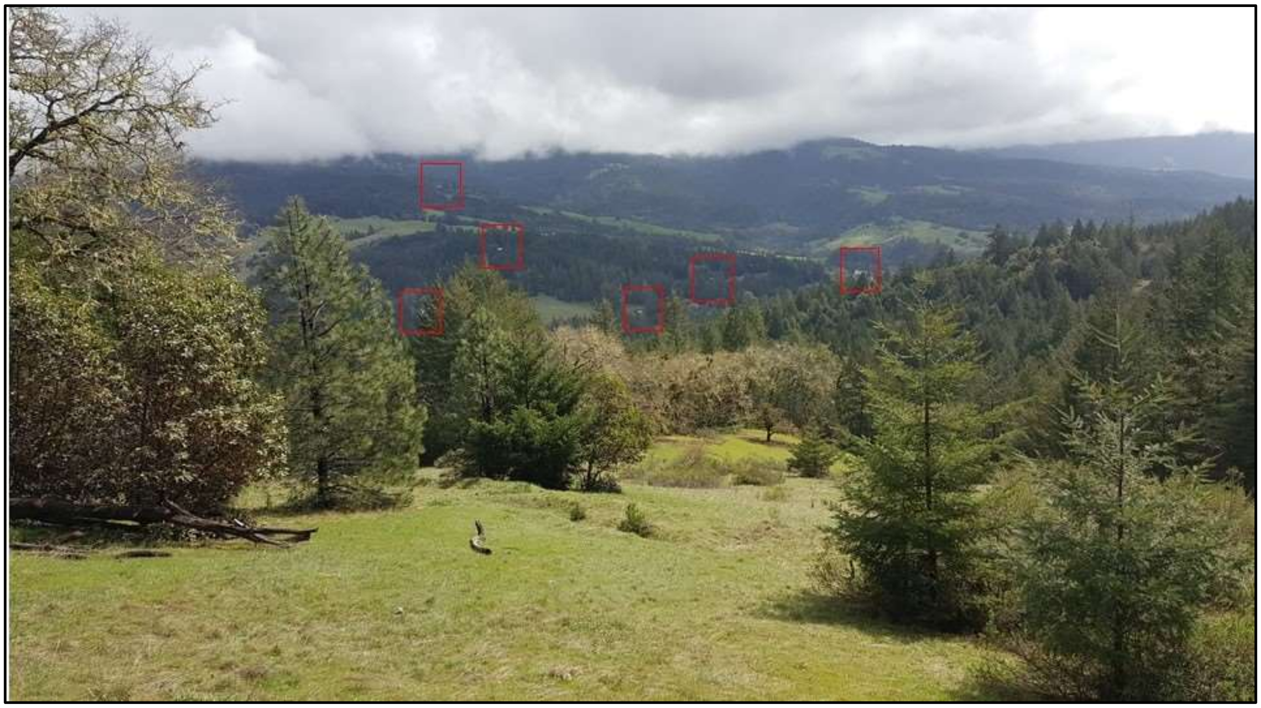


FIGURE 13. Six cannabis structures (outlined in red squares) in "the bowl" seen from Sally Seedless's property. Photo by author (2018).

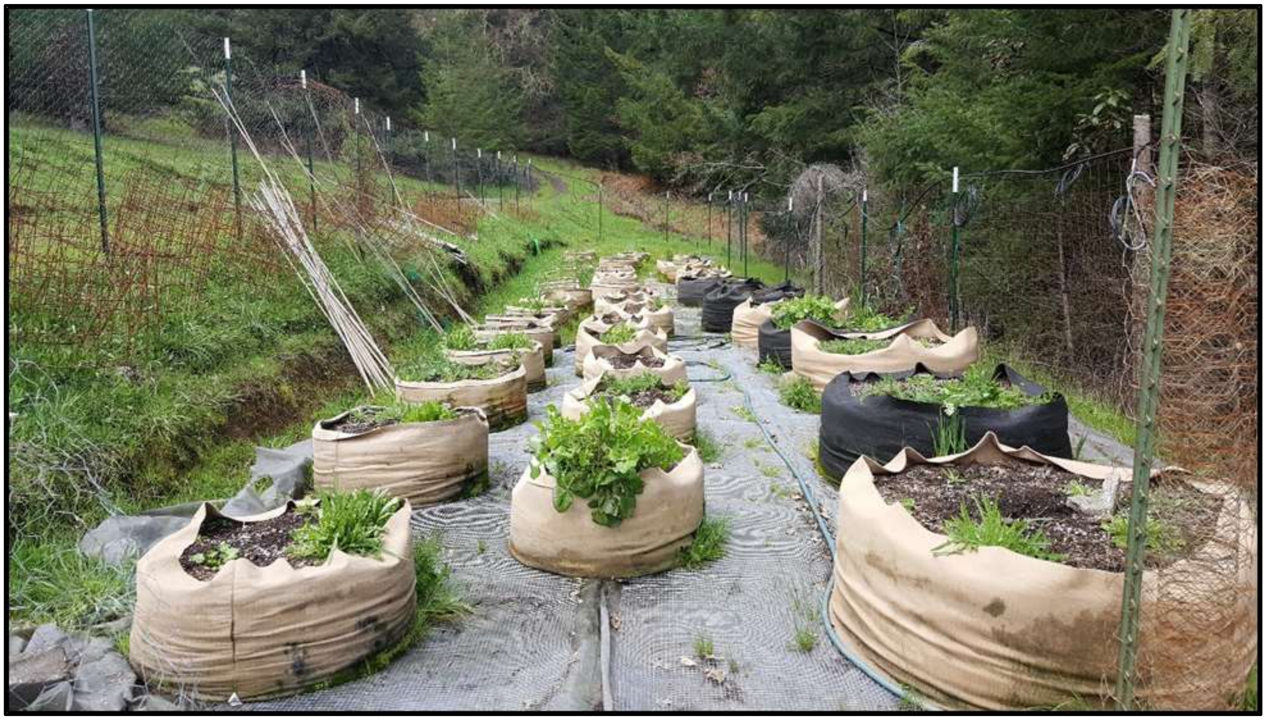


FIGURE 14. Grow bags to be planted for 2018 harvest. Photo by author (2018).

$100,000 on associated upgrades, fees, taxes, and improvements. The move into a post-prohibitionist market has her still sitting on product from last season that needs to be groomed before it can be sold for the best price. She says that the market has become so inundated that she is selling groomed marijuana for less than $600 per pound to move product so that she can continue the compliance process and seed this year's crop. She recalls in 1979 the going rate for a pound was $1600 and at the market height in the mid-1990s that pounds sold for $6200 before a steady decline after the passage of Prop 215 and medical marijuana cultivation was decriminalized. She reminds me that becoming a legal player in the market is costly; I think she is hinting that the costs are related to or consequence for participating in the illegal markets for so long. "It seems that only growers who previously made a lot of money can even attempt the compliance process," she says. "Rewarding the large growers feels a bit unfair to many of the small growers."

I talked to Sally again a month after our initial interview and she says that the costs to become a legal cannabis cultivator are too high. Her business is just small enough that it does not qualify for the smallest cultivation license type ("Cottage") and entering the legal market will be virtually impossible without scaling up. She laments that the costs thus far are making it difficult to even hold on to her house. She was previously cultivating under the regulations of Prop 215. "I was a medical marijuana patient and, in the past, have grown under a valid physician's recommendation," she reports. "The allowance for medical marijuana grows is very unclear right now."

Because of the uncertainty around regulation and costs related to a larger operation, she is hesitant to grow more than the six plants now allowed for adults in California under Proposition

64 and is hopeful that she can sell the product she still has so that she can cover her basic costs of living.

Cash, 37 Years Old, Tulare County, Third Generation Dairy Farmer

I meet Cash for an audio recorded interview at his home in Tulare County on a dairy farm in October 2017. Tulare County is the “Dairy capital of the world,” but low milk prices may entice more dairy farmers to explore cannabis as an option to increase farm incomes. His family farms 2000 acres of land; 200 acres exclusively dairy and the remaining 2000 produce feed for his cows: wheat, corn, alfalfa and almonds. He says cannabis and marijuana are one in the same, used for “getting high, treating sick people, and making soap (products from hemp).” Cash hunts in Sequoia National Forests that one can see from his property and has come upon drip irrigation lines that are used in illegal grows in the forests and says that they are a problem. His motivation for joining other ganjapreneurs in the Green Rush is purely monetary, diversifying the farm to make more money: “Milking cows in California is not a very profitable business.”

Tulare County is ripe with facilities that can be converted to indoor cannabis cultivation operations and he believes that more dairy farmers will consider cannabis cultivation as an option to keep dairies afloat; Cash says that milk production is leaving the state because the profit margin is very tight. When asked about feeding cannabis or parts of the cannabis plants to cows he tells me,

> A happy cow is a relaxed cow. Sixteen years ago in Idaho (at a conference) I suggested feeding cows cannabis (to another dairy man). Cows need to eat, drink and relax to make milk. Cannabis makes you hungry, gives cottonmouth (drymouth), and makes you chill. Those three combos in a cow would be perfect. I’ve always wanted to try it.

Cash says that he would devote some three to four acres of free-stall barns to cannabis production if he could. But he says, “I just need to know it’s okay to move forward.” Just exploring the possibility of cannabis production was enough to warrant a warning from his bank, that they would demand payment of the dairy’s multi-million-dollar loan if he moved forward with any cultivation plans. There is plenty of land in Tulare County to grow cannabis and Cash thinks that legality will stifle crime related to cannabis cultivation.

> I think it will shut down the violence in Mexico. The cartels, they will have no reason to come here. We can have it legally so this whole drug wars will end. They have nothing to bring, the weed stuff. The cocaine or whatever, that’s different. They’re bringing all these people over here, throwing them out in our hills growing up here. (He points behind himself to the National Forest.) People get shot, hunters are getting shot because they stumble across a grow. All that’s going to end. There’s no more reason for illegal activity. It’s (cannabis) here.

Danny, 33 Years Old, Merced County, VP of Technology at Bowles Farming Company

On a Friday morning in May 2018 I meet Danny Royer. I ride around with him for an audio recorded interview while he checks his fields. Danny comes from Cal Poly, San Luis Obispo where he majored in Agricultural Systems Management. He is looking at hemp from an integrated perspective, including soil health, water use, and increases in field productivity from increased organic matter. He sees the interest around the county but the confusion around and uncertainty of regulations are preventing him and others interested in producing high CBD hemp in the Valley from moving forward with their projects. He says that cannabis is commodifiable but despite CEO Cannon Michael’s desire to plant 200 acres of cannabis, cultivation is banned in Merced County, a change in the last year from regulation that previously allowed production of medical marijuana under Prop 215 because outdoor cultivation is, “infested with black market activities,” in Merced County.

> At this point the County does not differentiate industrial hemp or marijuana. As far as they are concern [sic] it is what it is. They are probably going to prosecute you even if you are growing something under the .3” and there are state measures that allow that (SB 676). Easiest way for law enforcement to get a hold of illegal activities is to have an all-out ban, a switch from the previous ten or fifteen years (under Prop 215 and SB420).

The black-market presence in the community is detrimental to cannabis being adopted in the free market model. Illegal grows are not only bad for communities but also to our natural resources. Danny looks to Humboldt County and sees a solution for small growers in Humboldt County and the Emerald Triangle: “marketing,” becoming marketing gurus and experts. He says, “If I was a small grower in Humboldt right now I’d be figuring out how to get on Instagram and really telling my story, creating a brand about what I’m doing.”

Allowing the designation of appellation, a geographical indication denoting a specific culture and/or physical feature by codifying place name (Murray and Overton 2011), for cannabis growing region is another suggestion, like what has happened with Napa Valley wines. “I think that will create a higher demand product like going and buying a bottle of wine from Napa County is a whole lot more expensive than me going on the Madera Wine Trail and buying a bottle.” He adds:

> There’s a huge demand for this product. Whether its hemp, recreational, medical, cannabis is in demand and those demands are going to be diverse and going to require a diversity in production. I’m not interested in capturing 100% of the cannabis market. I’m interested in finding the pieces of that market that meet the resources I have... The

> demand exists national and internationally for cannabis products that is large enough to fulfil everybody's needs at this point who is producing. If we create a good legal system and framework for having this market and we mimic a lot of what already exists in agricultural commodities, whether it's testing or traceability all of those systems exists in agricultural commodities at scale already. This is where I said a lot of cross learning can happen. If we get those systems into place the market is going to decide what survives and what doesn't. I think there is going to be a diversity of markets and that's why, big grower, small grower, everyone's got a place to play.

Troy, 38 Years Old, Merced County, Third Generation Family Farmer

On a Saturday morning in May 2018 I meet a Merced County farmer at his home for an audio recorded interview. Troy is a graduate of Fresno State University and holds a degree in plant science with an emphasis on agronomy, the science of soil management and crop production, and is looking to grow industrial hemp. He was approached by breeders of a low-THC strain of cannabis with high CBD levels. The breeders have created a variety that would decrease the production time of hemp in a "sustainable" way and want to increase their seed bank, foreseeing the rapid growth of the hemp cannabis industry and came with about one hundred acres of seed. Troy thought this opportunity to diversify his farm was possible from language in a recent Farm Bill. Section 7606 of the Farm Bill of 2013 is the Legitimacy of Industrial Hemp Research. This act defines hemp as distinct from marijuana, in that, "the plant Cannabis sativa L. and any part of such plant, whether growing or not, with a delta-9 tetrahydrocannabinol (THC) concentration of not more than 0.3 percent on a dry weight basis." The bill permits agricultural or academic research or allow research to be conducted as an agricultural pilot program which permits the study of the cultivation growth and marketing of industrial hemp if that the State of research permits growth and cultivation. California allows cultivation but language in 2001 SB 676 (see Table 1) does not permit the growth of industrial hemp in Merced County without approval of State authorities and under the guidance of an institution of higher learning or CDFA. Troy started to go through the appropriate government channels in Merced County to move forward with his plans to grow cannabis for the purpose of producing seeds. He recounts:

> Everything was building steam. The sheriff was interested. The ag commission was interested. A few of the Board of Supervisors in the County were interested….the Farm Bureau. Legality-wise, we weren't selling it yet. We were just creating the seed. We were growing the crop, it wasn't anything to do with cannabis (recreational use).

Looking to the future, Troy wants to be ahead of the game and really started looking hard at that bag of seed left by the breeders.

> So we started thinking about the seed and the future, and next year if the Farm Bill, which we're very confident Mitch McConnell, will get hemp turned into an agricultural commodity in the Farm Bill. At that point we want to have seed and have the industry ready to up and run. There is seed in Kentucky and somebody will be producing the seed and somebody will be ahead of the game on how to grow.

He talks about growing considerations like row spacing and size, irrigation systems and soil fertility. There's plenty to learn about cannabis, he admits. As more small cannabis cultivators are pushed to increase size, Troy believes that they will come to adopt fertility practices and principles used in large scale agriculture to maintain economic stability and continuity.

When Troy met with a representative from the Merced County Marijuana Task Force, he was told the following, as he reports:

> There is no cultivation legal in the County, no matter what. He said it doesn't matter if it's for seed, if it's for hemp, it doesn't matter if its hops for beer. There's none allowed in the county.

Troy wants Merced County to be ready for hemp to become an agricultural commodity and reached out to the Merced County sheriff and the Marijuana Task Force to start an agricultural pilot program to learn more about hemp and set up the regulatory framework in the County before language in the upcoming Farm Bill is written. Troy tells the County officials:

> Look guys, if this Farm Bill passes next year I'm going to grow 3-400 acres and the next year we're going to grow 10,000 acres in the county. I'm going to get growers and we're going to grow it and we're going to know how.

The medical benefits of CBD hemp (Sultan et. al 2017) were a main area of interest for farmers in the Central Valley and interest in CBD is growing in the mainstream. Danny and Cash both had similar stories to what Troy told me below:

> What really interests me in this (cannabis) is CBD. These old farmers that have all been against these hippies smoking weed and everything, I had one tell me that CBD oil cured his wife's breast cancer. You don't hear people talking about that. Here a guy like that saying that it cured cancer is very powerful, you know. There's people with children that it helps. There's no psycho effect to the CBD. So I just think that basically it's a wonder drug.

In his research Troy found companies interested in adding CBD to medicate animal feed. “Purina wants to make CBD infused dog food and pet treats. National Milling Company wants make CBD infused, medicated horse feed.”

Other Insights

Costs to legitimately enter the cannabis industry are steep and include a “one-time application cost, annual licensing fees, complying with new tax codes, land use modifications, ecological remediation expenses, building infrastructure improvements, water storage (Sandy 2018) and any other cost or fee associated with bringing a cannabis cultivation operation into compliance. CalCannabis Cultivation Licensing fees stated on the Annual Licensing Application (2018) range from $135 for Specialty Cottage Outdoor to $8655 for a Medium Indoor grow site. Mendocino grower and California Growers Association (CGA) vice chair Casey O’Neill feels the squeeze, in some cases paying thousands and thousands of dollars to come into compliance before even applying for a state license. Many small growers like Casey and interviewees Gary and Sally operate at a subsistence level and cannabis growers can’t get bank accounts or financing. O’Neill tells *Cannabis Business Times*,

> The only money we can get it either growth-oriented venture capital (scaling up), which comes with a whole set of dangers, or really high-interest hard money loans. People are being asked to do things [that] are pushing them into bad situations with really little recourse (Sandy 2018).

O’Neill went to Sacramento to argue his case that MAUCRSA has cannabis growers attempting to enter a legal industry tangled in a maze of cost, fees and forms. With many communities not offering employment opportunities outside of the cannabis industry, the post-prohibition era told lawmakers, the Mendocino grower said that the regulations were having drastic impacts on Emerald Triangle communities and economies that is a crisis caused by "thousands (of) papercuts, not a single wound (Sandy 2018)." Casey told *Cannabis Business Times* (2018) about how the transition into a regulated cannabis cultivation economy is affecting communities and legacy cannabis growers:

> Right now, the program's not working for a lot of people. I'm a big believer in community. I'm a big believer in local food security, and I'm also a very big believer in diversified farms. I think a monocrop farm portfolio is an inherently unstable organism and a bad idea. … Cannabis is the economic mainstay of a lot of rural communities, and people are trying to figure out what's going to happen. The big concern is that cannabis dollars – you know, local farm dollars – recirculate within the local community a number of times. We're seeing fallout in the traditional business sector as well. Revenues are down, there's not much spending going on. This is rapidly approaching an economic crisis for a lot of rural communities, while large, well-capitalized businesses are essentially able to run away with the show (Sandy 2018).

Over the course of this study I have been able to identify the role of cannabis in California agriculture. Legacy growers in the Emerald Triangle were discovered as well as interested ganjapreneurs from the Central Valley. Their motives varied from continued subsistence in isolated communities to diversification for large scale farming operations. Using published data on California cannabis cultivation as well as CDFA survey responses permitted the creation of maps to speculate concentrations of cannabis cultivation by county on unincorporated lands. As regulations and legislation continues to develop for cannabis in California it may be easier to locate areas of cannabis cultivation concentrations. Enforcement and regulations vary from county to county, and even more so at the subcounty level and does not permit the development for a more definitive map of cannabis cultivation concentrations. Snowball recruitment method used for interview participants was effective in allowing multiple participants in varied study locations to volunteer information for analysis. Walking with video as an interview method provided the richest analysis experience as emotions were more easily identified and allowed for more through description of answers to questions. Continued use of snowball recruitment when studying cannabis is endorsed, as well as the use of pseudonyms to protect participants, as it allows voluntary participation of interviewees to disclose engagement in illegal activities, and the use of walking with video as an interview technique should be more widely adopted by those who study cannabis to further document cannabis culture that has been hidden under the leaves of illegality for over fifty years.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

One's destination is never a place but rather a new way of looking at things.

Henry Miller (1957)

As I conclude this research national and global cannabis regulations and viewpoints are beginning to change. In June 2018 the United States Senate unanimously approved adding language in the 2018 Farm Bill that would recognize June 4-10 as Hemp History Week yearly (Angell 2018). Although this would not directly allow farmers to grow hemp without persecution it is a resolute display that Congress may soon move to change the crop's status so that hemp cannabis could be more widely cultivated (Angell 2018). Canada became the second country in the world to legalize marijuana, permitting home growing, possession, and sale to adults in June (Lopez 2018) after Uruguay's government established a legal marijuana industry in 2014 (Pardo 2014). The Canadian government hopes to choke the black market in this move to restrict, legalize, and regulate access to marijuana (Lopes 2018).

As of mid-March 2018, 2477 temporary cannabis cultivation licenses have been issued by CalCannabis Cultivation Licensing (Sandy 2018). The legalization of cannabis will change agriculture in California and this study looks to show changes by answering these questions:

1. Who are the marijuana growers emerging from the shadows of prohibition, why did they persist in the face illegality, and what impacts to the industry do they foresee in the new context of legality?
2. Who are the new entrepreneurs entering the industry, where are they located, what are their intended scales of production, and what are their motives?

Revealing marijuana growers that have historically cultivated in the Emerald Triangle began with a review of literature and supported by personal perspectives I collected during interviews with cannabis farmers. They are described as legacy growers who began cultivating during the first Green Rush in the late 1960s. Cannabis cultivation became a way to make a living in economies that struggled to recover after the exodus of primary resource extraction industries or as a departure from the city life in favor of a return back to the land. Legacy growers interviewed see fewer and larger cannabis growers in the future and have abandoned plans to enter the legal market due to high costs of compliance and licensure.

Identifying the location of prospective ganjapreneurs and interested sizes of operation began by analyzing survey data from the CDFA. As the world's most consumed illicit substance it is no surprise that interest in cannabis cultivation is clustered in densely populated areas of the state that often have limited access to farmland. Southern California shows the greatest interest in the cannabis industry with the most responses from Los Angeles County for every CDFA Cannabis Cultivation Interest category. As densely populated as Los Angeles County is, this presents an interesting question of where these businesses will develop around Southern California. Since this research is focused on the cultivation of cannabis and not what happens after harvested product leaves the farm, new concerns around crime and pollution should be of concern to residents of Southern California as cannabis cultivation will no doubt continue to strain law enforcement and water availability to meet all the demand.

Gathering additional personal perspectives I interviewed interested ganjapreneurs from the Central Valley and all have roots in Central Valley agribusiness. Two have college degrees focused on agricultural production, the other three generations of dairying experience and all have capital needed to enter the legal cannabis industry. It is illegal to grow cannabis on unincorporated areas in Merced County, and Danny and Troy are hitting regulatory roadblocks. Danny and Troy do not want to grow resin rich marijuana like that which has made the Emerald Triangle infamous. Both believe that the market is inundated with high-THC cannabis and look to CBD-rich hemp as a way to enter the market at a grander scale. Both hope to be growing thousands of acres of cannabis as soon as there is language in the next Farm Bill to do so and if the plant loses its Schedule I narcotic label. Cash wants to convert some of his dairy into cannabis cultivation as well, but he is less interested in hemp than Danny and Troy. He sees cannabis as a way to keep his farm competitive just like Danny and Troy and move his dairy into the future, Cash even talked of green milk. Cash, Danny, and Troy believe that the adoption of non-prohibitionist regulations will hurt small growers in northern California and that there are ways that each side of the spectrum can learn from each other.

After the CDFA survey was given, another smaller class was added to the list of licenses that farmers could apply for, Specialty Cottage. Even with a smaller license size there are many legacy farmers like Sally who are being pushed out of the legal market; neither qualifying as a small enough operating for the smallest Specialty Cottage license, nor a large enough operation for the Specialty license. Sally, Gary, Casey and Donny’s mentor are typical examples of legacy cannabis farmers, cannabis pioneers who began growing in Northern California during the first Green Rush. Legacy cannabis cultivators began growing cannabis as a way to make a living far from the city and in the wake of local economic woes after the departure of primary industry jobs. Sally and Gary both have grown resin rich marijuana in the Emerald Triangle from seed and have since made it a viable livelihood, not an extravagant life that is often envisioned of people who grew cannabis illegally but rather one of subsistence, community and now uncertainty.

Illegal grows being discovered in the Emerald Triangle carry hefty fines. Donny's mentor had three illegal grow sites discovered as he waited for his cultivation application to be processed; the illegal grows were fined twenty thousand dollars each and he has abandoned his multi-greenhouse light-deprivation cultivation plans as discussed in our interview. Costs of compliance are great and Sally is no longer going to be able to step from the shadows and enter the legal market. Gary has withdrawn his application after he found building compliance requirements excessive and too costly. It is clear that both are scared as they see how the cards have fallen since the implementation of the regulations of MAUCRSA and the adoption of a non-prohibitionist regime of regulation may keep many legacy farmers hesitantly in the dark. They see fewer and larger cannabis farms in the future. The mystique of Humboldt cannabis and the association that cannabis from Humboldt is superior will continue but at what scale is unknown. "If I got a buddy who says, "Hey I got some tree from up in Humboldt," I'm usually excited because I know it's going to be a superior product" (Danny interview 2018).

There are interested ganjapreneurs across the state. As CDFA survey results show (see Figure 4 and Appendix A), the largest concentration of people with interest in the cannabis industry are in Southern California, not in existing agricultural regions. Four interview participants are men I would classify as newcomers to the Green Rush. Donny grows in Humboldt County but is not a legacy grower or even old enough to have started cultivating cannabis in the second Green Rush that came after the passage of Proposition 215. He was growing "medicine" for a veteran Humboldt horticulturist, but by shadowing a professional in the industry he is acquiring a wealth of proprietary knowledge useful for success in cannabis. Donny was preparing a one-acre site for greenhouses, much larger a growing operation than legacy farmers interviewed, Gary and Sally.

The geography of California greatly influences the distribution and success of cannabis in California today. Today cannabis in California is grown for its resin and high-THC content, but an emerging CBD industry could change the game. If cannabis is declassified as a Schedule I drug, peer reviewed research will be able to study cannabis and all of the properties of a growing number of discovered cannabinoids other than THC and CBD. Growers in Northern California should band together to offset costs associated with upscaling and work collectively to discover innovative ways to tell their story as framework for the appellations of cannabis growing zones can be determined. Northern California cannabis growers should also consider new ways to use facility infrastructure that was left behind by the departure of the timber, fishing, and mining industries as a way to lower costs of production. A new hemp industry has the possibility to revitalize the economies of rural communities in the Central Valley. After the decline of the domestic cotton market in the 1990s, many small towns in the San Joaquin Valley saw the departure of many jobs that left cotton gins vacant and decaying. Hemp processing could bring new life sleepy farming towns that have felt an economic downturn similar to those faced in northern California after the passage of contemporary cannabis legislation.

Today cannabis in California is produced for commercial activities and is an agricultural commodity, according to the Williamson Act. Legacy growers will continue to struggle coming into the new contexts of legality and many cannot or will not make the switch. Legality must match the interest of the state. When Assemblyman Jim Wood stated that cannabis was going to be treated like an agricultural product he was only referring to “medical cannabis.” This presents another challenge for legislators and ganjapreneurs because this does not include recreational use or hemp. The Legal Green Rush is nothing new, nor is it a place Californians have not been before. Just as gold came and went in northern California and the cotton industry sustained and departed communities in the Central Valley, cannabis cultivation allows for new conceptualizations of what farming is, who farmers are, and why they persist in a market whose future can just as easily go up in smoke. Further research in the cannabis cultivation realm can include the impacts of trimmigrant populations have on cultivation operations, violence and danger faced by sex workers associated with work on The Hill, designation of appellations, cannabis terroir, and the adoption of cannabis education programs. Returning to Central Valley and where this research began, interview participants here said that, “Agriculture is set to make the transition” (Danny interview 2018) and that, “As soon as the door cracks opens we want to fly through it and not just peek through it (the legal hemp cannabis market). This is no longer the devil’s weed. The THC market is past” (Troy interview 2018). Cannabis is changing agriculture in California and the opportunities are budding for ganjapreneurs and ganjacademics (academic researcher of cannabis) in the Golden State.

APPENDICES

APPENDIX A

CDFA SURVEY DATA BY COUNTY

APPENDIX A

CDFA Survey Data by County (2017a)

Type	1	1A	1B	2	2A	2B	3	3A	3B	4	6 & 7	8	10 & 10A	11	12	Total
Alameda	80	105	46	48	75	40	30	64	35	66	149	32	115	126	130	1141
Alpine	8	4	5	7	7	6	5	5	9	9	2	4	3	7	3	84
Amador	9	5	5	3	4	3	7	2	4	4	5	1	6	5	1	64
Butte	49	23	31	33	17	20	32	15	21	33	21	10	18	28	36	387
Calaveras	86	44	57	40	27	40	72	29	118	54	59	22	38	66	91	843
Colusa	4	1	-	-	-	1	1	1	1	-	2	0	0	3		14
Contra Costa	28	41	20	21	30	15	8	19	10	21	35	8	34	38	39	367
Del Norte	8	9	6	6	5	2	-	-	3	7	6	-	3	3	5	63
El Dorado	44	34	32	30	23	23	38	19	31	39	35	15	30	40	45	478
Fresno	24	20	14	13	12	13	16	13	18	24	12	11	31	32	27	280
Glenn	3	1	2	1	2	2	2	3	2	3	2	-	4	7	3	37
Humboldt	88	38	46	37	18	34	59	22	38	51	88	18	38	61	86	722
Imperial	13	9	9	11	6	8	10	7	12	9	12	2	9	6	13	136
Inyo	2	3	3	5	2	2	2	3	6	4	4	1	1	1	4	43
Kern	23	20	24	18	18	20	23	17	17	17	17	11	26	21	27	299
Kings	15	13	14	13	13	14	17	14	14	12	12	9	10	10	9	189
Lake	40	16	22	29	11	25	39	19	30	30	24	3	17	21	27	353
Lassen	15	3	2	5	2	3	10	1	2	8	3	1	5	6	12	78
Los Angeles	187	248	141	110	174	101	90	178	113	152	273	83	275	300	293	2718
Madera	10	4	5	5	5	5	9	5	6	8	10	3	13	10	12	110
Marin	15	11	10	10	10	9	8	6	9	10	13	6	29	19	17	182
Mariposa	13	6	6	6	5	6	8	5	10	7	9	4	8	4	9	106
Mendocino	159	36	79	83	19	64	104	16	68	71	101	11	49	69	112	1041
Merced	11	7	6	7	9	6	10	8	8	9	10	6	14	13	11	135
Modoc	3	1	-	1	1	1	2	-	-	-	0	-	0	-	1	10
Mono	-	1	2	-	-	-	2	-	1	-	1	1	0	2	2	12
Monterey	36	26	24	26	19	37	33	28	47	28	43	8	26	33	41	455
Napa	6	11	7	8	6	5	8	11	6	9	9	3	11	13	14	127
Nevada	157	52	84	90	31	58	53	17	31	70	76	18	33	58	102	930
Orange	54	71	39	34	52	35	24	46	34	42	72	30	114	108	97	852
Placer	71	54	51	41	28	42	53	40	50	50	46	14	53	48	63	704
Plumas	2	2	2	3	2	3	5	2	4	3	4	-	2	5	5	44
Riverside	85	78	47	41	64	34	40	70	49	66	82	25	85	93	100	959
Sacramento	79	103	61	49	80	55	45	73	61	70	100	40	109	131	121	1177
San Bernardino	87	99	68	61	77	51	48	70	56	64	72	37	88	100	117	1095
San Benito County	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Diego	122	102	89	75	82	75	69	68	71	91	110	47	132	144	138	1415
San Francisco	30	47	18	17	40	19	13	28	18	27	61	10	92	92	76	588
San Joaquin	22	23	16	11	13	12	14	11	10	17	20	7	24	23	22	245
San Luis Obispo	61	39	42	34	28	27	32	24	38	35	38	13	43	50	59	563
San Mateo	10	9	7	5	12	7	3	8	8	8	6	2	14	9	11	119
Santa Barbara	24	19	20	20	16	17	28	13	23	20	29	9	33	32	33	336
Santa Clara	18	17	11	10	14	9	9	12	9	12	12	1	27	19	21	201
Santa Cruz	45	31	34	29	22	26	27	21	23	28	42	5	37	37	49	456
Shasta	25	21	16	11	10	10	12	7	12	16	12	2	12	12	19	197
Sierra	12	1	4	4	0	2	5	0	2	5	1	0	1	5	7	49
Siskiyou	17	5	5	16	6	6	15	6	5	9	8	0	4	5	12	119
Solano	18	15	10	12	12	8	8	8	6	17	11	4	20	17	18	184
Sonoma	63	53	46	48	33	42	55	40	51	54	93	11	51	65	86	791
Stanislaus	11	10	9	8	14	9	12	14	9	14	12	4	19	13	14	172
Sutter	6	8	6	4	4	5	5	5	8	6	4	-	3	8	9	81
Tehama	10	4	7	4	4	3	5	1	1	5	3	1	3	6	8	65
Trinity	34	18	18	24	10	14	18	5	15	17	16	3	7	10	26	235
Tulare	14	14	8	7	7	5	7	5	6	6	6	1	9	10	11	116
Tuolumna	15	17	13	13	11	7	9	6	7	15	12	4	8	6	12	155
Ventura	34	29	31	24	25	18	29	19	24	29	32	10	31	33	49	417
Yolo	39	17	23	14	10	14	38	16	36	23	21	6	26	27	36	346
Yuba	17	4	13	17	7	10	16	9	14	14	13	2	10	15	18	179

APPENDIX B

LEGALITY OF CANNABIS CULTIVATION ON UNINCORPORATED LANDS

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LEGALITY OF CANNABIS CULTIVATION ON UNINCORPORATED LANDS

County	3/15/2017	4/1/2018	Changes
Alameda County	Banned	Banned	Banned
Alpine County	Banned	Banned	Banned
Amador County	Approved	Banned	Changed
Butte County	Approved	Approved	Approved
Calaveras County	Pending	Pending	Pending
Colusa County	Banned	Banned	Banned
Contra Costa County	Banned	Banned	Banned
Del Norte County	Approved	Banned	Changed
El Dorado County	Approved	Approved	Approved
Fresno County	Banned	Banned	Banned
Glenn County	Approved	Banned	Changed
Humboldt County	Approved	Approved	Approved
Imperial County	Approved	Approved	Approved
Inyo County	Approved	Approved	Approved
Kern County	Banned	Banned	Banned
Kings County	Banned	Banned	Banned
Lake County	Approved	Approved	Approved
Lassen County	Approved	Approved	Approved
Los Angeles County	Banned	Banned	Banned
Madera County	Approved	Approved	Approved
Marin County	Approved	Approved	Approved
Mariposa County	Approved	Approved	Approved
Mendocino County	Approved	Approved	Approved
Merced County	Approved	Banned	Changed
Modoc County	Approved	Banned	Changed
Mono County	Approved	Approved	Approved

County	3/15/2017	4/1/2018	Changes
Monterey County	Approved	Approved	Approved
Napa County	Approved	Approved	Approved
Nevada County	Approved	Approved	Approved
Orange County	Approved	Approved	Approved
Placer County	Banned	Banned	Banned
Plumas County	Pending	Pending	Pending
Riverside County	Banned	Banned	Banned
Sacramento County	Approved	Approved	Approved
San Benito County	Approved	Approved	Approved
San Bernardino County	Banned	Banned	Banned
San Diego County	Approved	Approved	Approved
San Francisco County	Approved	Approved	Approved
San Joaquin County	Banned	Banned	Banned
San Luis Obispo County	Pending	Pending	Pending
San Mateo County	Approved	Approved	Approved
Santa Barbara County	Banned	Banned	Banned
Santa Clara County	Approved	Approved	Approved
Santa Cruz County	Approved	Approved	Approved
Shasta County	Approved	Approved	Approved
Sierra County	Approved	Approved	Approved
Siskiyou County	Approved	Approved	Approved
Solano County	Approved	Approved	Approved
Sonoma County	Approved	Approved	Approved
Stanislaus County	Banned	Banned	Banned
Sutter County	Approved	Approved	Approved
Tehama County	Approved	Banned	Changed
Trinity County	Approved	Approved	Approved
Tulare County	Approved	Approved	Approved

County	3/15/2017	4/1/2018	Changes
Tuolumne County	Approved	Banned	Changed
Ventura County	Approved	Banned	Changed
Yolo County	Approved	Approved	Approved
Yuba County	Approved	Banned	Changed

(Cannabusinesslaw 2017 and 2018)

APPENDIX C

PROPOSED INTERVIEW TOPICS

APPENDIX C

PROPOSED INTERVIEW TOPICS

The legal Green Rush: New California agricultural geographies in commercial cannabis cultivation

Proposed Interview Topics:

Cannabis or marijuana? (Preferred terminology, is there a difference?)

Do you cultivate medical or adult use cannabis?

How long have you cultivated cannabis?

Why do you want to begin or why do you/did you continue to cultivate cannabis?

What is the size of past, current or potential cultivation operation?

Now that the adult use of cannabis is legal for those 21 and older, do you see any problems on the horizon?

Have you faced any barriers to enter the cannabis industry or encountered regulations that impact your success as a cannabis cultivator?

Should cannabis be legal nationally? For what uses?

Primary investigator: Lucas Reyes

Faculty supervisor: Dr. Suzanne Dallman

REFERENCES

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Angell, T. 2018. U.S. Senate unanimously approves hemp measure. *Forbes*, June 5. https://www.forbes.com/sites/tomangell/2018/06/05/us-senate-unanimously-approves-hemp-measure/#292f6c431cc3 (accessed June 25, 2018).

Arnold, J.M. 2013. Energy consumption and environmental impacts associated with cannabis cultivation. M. S. thesis, Humboldt State University.

Basiouka, S., and C. Potsiou. 2013. The volunteered geographic information in Cadastre: perspectives and citizens' motivations over potential participation in mapping. *GeoJournal* 79 (3): 343-55.

Bauer, S., J. Olson, A. Cockrill, M. V. Hattem, L. Miller, M. Tauzer, and G. Leppig. 2015. Impacts of surface water diversions for marijuana cultivation on aquatic habitat in four northwestern California watersheds. *Plos One* 10 (3): e0137935. doi:10.1371/journal.pone.0120016.

Bauss, C. I. 2017. Mapping marijuana cultivation sites and water storage in the Redwood Creek Watershed, southern Humboldt County. *The California Geographer* 56:29-52.

Bennett, C. 2018. Marijuana farming is now for US agriculture. https://www.agweb.com/mobile/article/marijuana-farming-is-now-for-us-agriculture-naa-chris-bennett/ (accessed February 1, 2018).

Bernhard, H. 1915. Die agrageographie als wissenschaftliche disciplin. *Petersmann Mitteilungen* 61:12F, 100-103.

Butsic, V., and J. C. Brenner. 2016. Cannabis (*Cannabis sativa or C. indica*) agriculture and the environment: A systematic, spatially-explicit survey and potential impacts. *Environmental Research Letters* 11 (4):044023.

California Department of Food and Agriculture, CalCannabis Cultivation Licensing (CDFA). 2017a. CDFA survey results-license type by county-final. http://calcannabis.cdfa.ca.gov/ 2016 Licensing Survey Results (accessed on March 14, 2017).

------. 2017b. Who does what. http://calcannabis.cdfa.ca.gov/ CalCannabis FactSheet v7.0 (accessed on October 5, 2017).

------. 2017c. Medical and adult use (recreational) cannabis cultivation licensing frequently asked questions. http://calcannabis.cdfa.ca.gov/ CalCannabis FAQ Medicinal-Adult Use_web_8.24.17.pdf. (accessed on September 5, 2017).

------. 2018. CalCannabis cultivation licensing- Annual licensing application. https://cannabis.ca.gov/apply-for-a-license/ (accessed on June 11, 2018).

California State Assembly. 2015a. Assembly Bill No. 243, Chapter 688.
------. 2015b. Assembly Bill No. 266, Chapter 689.

------. 2017. Assembly Bill No. 1564, Section 51201.

California State Senate. 2015. Senate Bill No. 643, Chapter 719.

------. 2017. Senate Bill No. 94, Chapter 27.

Cannabusinesslaw. 2018. "California cannabis laws by county." http://cannabusinesslaw.com/california-cannabis-laws-by-county/ (accessed on April 1, 2018).

Carle, D. 2004. *Introduction to Water in California*. Berkeley: University of California Press.

Caulkins, J. P., B. Kilmer, R. J. Maccoun, R. L. Pacula, and P. Reuter. 2011. Design considerations for legalizing cannabis: lessons inspired by analysis of California's Proposition 19. *Addiction* 107 (5):865–871.

Cocklin, C., L. Walker, and G. Blunden. 1999. Cannabis highs and lows: Sustaining and dislocating rural communities in Northland, New Zealand. *Journal of Rural Studies* 15 (3): 241-55.

Evans, J., and P. Jones. 2011. The walking interview: Methodology, mobility and place. *Applied Geography* 31 (2):849–858.

Garrett, B. L. 2010. Videographic geographies: Using digital video for geographic research. *Progress in Human Geography* 35 (4):521–541.

Gieringer, D. H. 1999. The forgotten origins of cannabis prohibition in California. *Contemporary Drug Problems* 26 (3):237-288.

Gregor, H. F. 1970. *Geography of agriculture: Themes in research.* Englewood Cliffs, NJ: Prentice-Hall.

Griffith, D. A., E. S. Morris, and V. Thakar. 2016. Spatial autocorrelation and qualitative sampling: The case of snowball type sampling designs. *Annals of the American Association of Geographers* 106 (4):773-87.

Herer, J., L. Cabarga, and T. McCormick. 2000. *Jack Herer's the emperor wears no clothes*. 11th ed. Austin, TX: Ah Ha.

Hickenlooper, G. J. W. 2014. Experimenting with pot: The state of Colorado's legalization of marijuana. *Milbank Quarterly* 92 (2):243–249.

Horizon Water and Environment, LLC. 2017. Literature review on the impacts of cannabis cultivation. https://static.cdfa.ca.gov/MCCP/document/Literature%20Review_February_2017.pdf (accessed on April 26, 2017).

Huffman, J. 2018. Forward. In *Where there's smoke: The environmental science, public policy, and politics of marijuana*, ed. C. Miller, vi-xi. Lawrence: University Press of Kansas.

Keene, S. 2015. Marijuana and the limits of knowledge: Implications for economic vulnerability and resilience in northern California. *Resilience* 4 (1):44-58.

Kepe, T. 2003. *Cannabis sativa* and rural livelihoods in South Africa: Politics of cultivation, trade and value in Pondoland. *Development Southern Africa* 20 (5):605-61.

Kolosov, C. A. 2009. Evaluating the public interest: Regulation of industrial hemp under the Controlled Substances Act. *UCLA Law Review* 57: 237-74

Leeper, J. 1990. Humboldt County: It's rôle in the Emerald Triangle. *The California Geographer* 30:93-109

Lenton, S., V. A. Frank, M. J. Barratt, H. V. Dahl, and G. R. Potter. 2015. Attitudes of cannabis growers to regulation of cannabis cultivation under a non-prohibition cannabis model. *International Journal of Drug Policy* 26 (3):257–266.

Liebman, E. 1983. *California farmland: A history of large agricultural landholdings*. Totowa, NJ: Rowman & Allanheld.

Lopez, G. 2018. Canada just legalized marijuana. That has big implications for US drug policy. https://www.vox.com/policy-and-politics/2018/6/19/17438154/canada-marijuana-legalization-cannabis-act-bill-c-45 (accessed June 25, 2018).

Malm, A. E., and G. E. Tita. (2007). A spatial analysis of green teams: A tactical response to marijuana production in British Columbia. *Policy Sciences* 39 (4):361-77.

Meisel, J. 2017. Hidden in plain sight: Cannabis cultivation in the Emerald Triangle. *The California Geographer* 56:3-26.

Miller, C., ed. 2018. *Where there's smoke: The environmental science, public policy, and politics of marijuana*. Lawrence: University Press of Kansas.

Miller, H. 1957. *Big Sur and the oranges of Hieronymus Bosch*. New York, NY: New Directions.

Mills, E. 2012. The carbon footprint of indoor cannabis production. *Energy Policy* 46:58–67.

Murray, W. E., and J. Overton. 2011. Defining regions: The making of places in the New Zealand wine industry. *Australian Geographer* 42 (4):419-433.

Nores, J., and J. Swan. 2010. *War in the woods: Combating the marijuana cartels on America's public lands.* Guilford, CT: Lyons Press.

Obasi, O. M. 2011. *More than a smoke: A global medical, economical and spiritual history of hemp and cannabis*. Pittsburgh, PA: Nourishing Botanicals.

Office of the California Attorney General (OAG). 2015. Submission of amendments to statewide initiative measure – Control, Tax and Regulate Marijuana Act, no. 15-0103. https://oag.ca.gov/system/files/initiatives/pdfs/15-0103%20%28Marijuana%29_1.pdf (accessed January 27, 2017).

Pardo, B. 2014. Cannabis policy reforms in the Americas: A comparative analysis of Colorado, Washington, and Uruguay. *International Journal of Drug Policy* 25:727–735.

Pink, S. 2007. Walking with video. *Visual Studies* 22 (3):240–252.

Robinson, D. A. 2015. Annual report on agriculture 2015: Merced County Department of Agriculture. http://www.co.merced.ca.us/ArchiveCenter/ViewFile/Item/521 (accessed March 3, 2017).

Rohde, J. 2014. *Both sides of the bluff*. Eureka, CA: MountainHome Books.

Romero, E. D. 2016. Could marijuana become California's next big ag crop? https://ww2.kqed.org/news/2016/02/16/could-marijuana-become-californias-next-big-ag-crop/ (accessed November 20, 2016).

Sandy, E. 2018. The Golden State rules. *Cannabis Business Times*, April 4. http://www.cannabisbusinesstimes.com/article/the-golden-state-rules/. (accessed April 4, 2018).

Scheuring, A. F. 1983. *A guidebook to California agriculture*. Berkeley: University of California Press.

Silvaggio, A. 2018. Cannabis agriculture in California. In *Where there's smoke: The environmental science, public policy, and politics of marijuana*, ed. C. Miller, 13-25. Lawrence: University Press of Kansas.

Small, E. 2015. Evolution and classification of cannabis sativa (marijuana, hemp) in relation to human utilization. *The Botanical Review* 81 (3):189–294.

Speer, J. 2017. The rise of the tent ward: Homeless camps in the era of mass incarceration. *Political Geography* 62:160-69.

Starr, H. E. 2013. The carrot and the stick: Tayloring California's unlawful marijuana cultivation statute to address California's problems. *McGeorge Law Review* 44:1070-1102.

Starrs, P. F., and P. Goin. 2010. *Field guide to California agriculture.* Berkeley: University of California Press.

Steinmetz, K. 2016. What to know about marijuana legalization in California. http://time.com/4565438/california-marijuana-faq-rules-prop-64/ (accessed March 8, 2017).

Stoa, R. B. 2017. Marijuana agriculture law: Regulation at the root of an industry. *Florida Law Review* 69 (2):1-64.

Stoll, S. 1998. *The fruits of natural advantage: Making the industrial countryside in California*. Berkeley: University of California Press.

Sultan, S. R., S. A. Millar, T. J. England, and S. E. O'Sullivan. 2017. A systematic review and meta-analysis of the haemodynamic effects of cannabidiol. *Frontiers in Pharmacology* 8:81. doi: 10.3389/fphar.2017.00081

TallBear, K. 2014. Standing with and speaking as faith: A feminist-indigenous approach to inquiry. *Journal of Research Practice* 10 (2): N17.

Taylor, J. S., C. Jasparro, and K. Mattson. 2013. Geographers and drugs: A survey of the literature. *Geographical Review* 103 (3):415–430.

Thompson, C., R. Sweitzer, M. Gabriel, K. Purcell, R. Barrett, and R. Poppenga. 2013. Impacts of rodenticide and insecticide toxicants from marijuana cultivation sites on fisher survival rates in the Sierra National Forest, California. *Conservation Letters* 7 (2):91–102.

Tsing, A. L. 2015. *The mushroom at the end of the world: On the possibility of life in capitalist ruins.* Princeton, NJ: Princeton University Press.

Warf, B. 2014. High Points: A historical geography of cannabis. *Geographical Review* 104 (4): 414–438.